THE IRON AGE

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Steel Consumption of Individual States

Distribution of the Secondary Users—Most in a Few States—East Makes Three-Fourths of the Steel and Uses Less Than One-Half

OVER one-half of the steel rolled for domestic enterprises of all descriptions goes from the so-called primary producers of the country into four States. Two-thirds, in the distribution from the mills, is absorbed in six States. Nine States account for three-fourths of the production not exported by the mills and, to put it another way, more than 95 per cent is taken by one-half of the 50 political divisions of domestic United States, comprising the 48 States and the District of Columbia and Alaska.

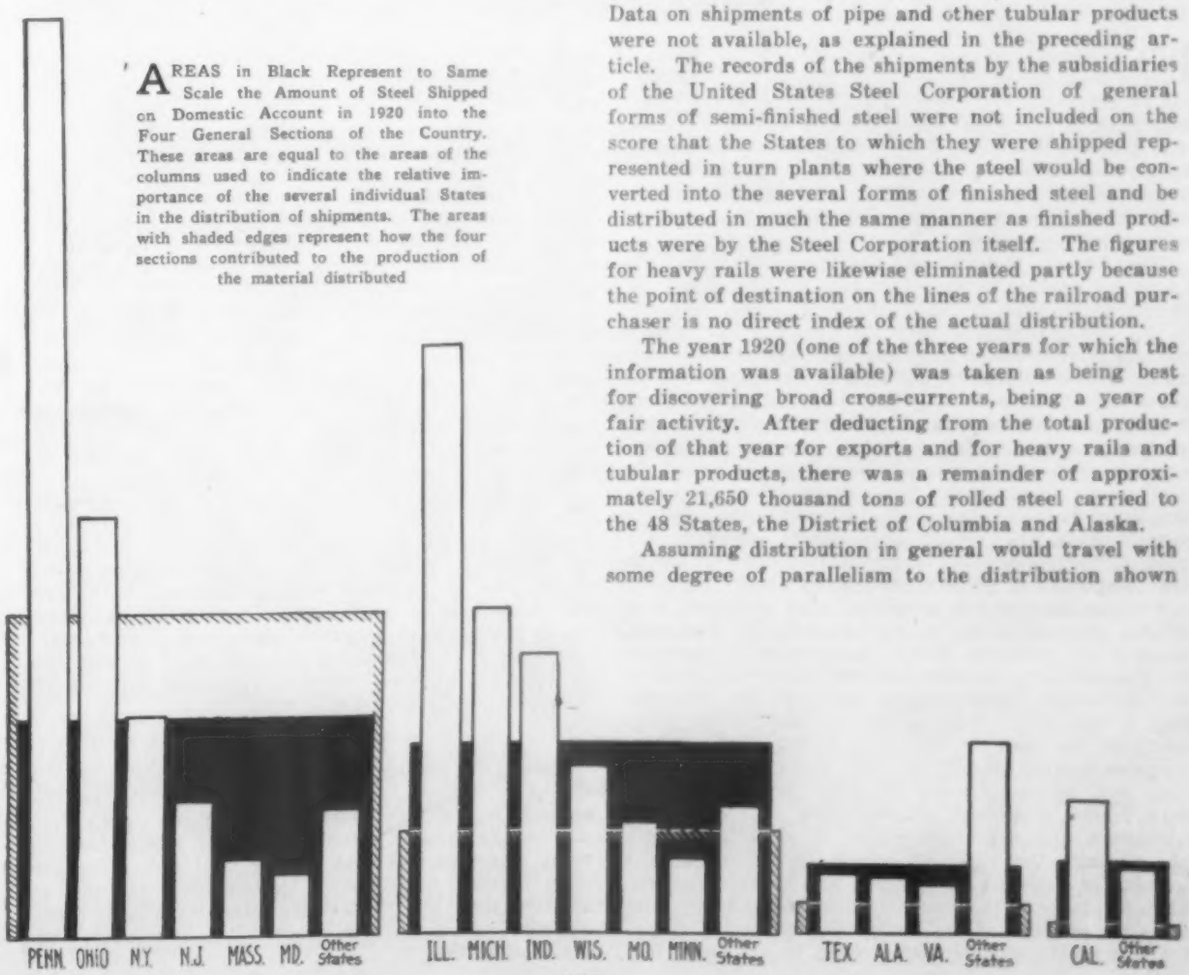
The foregoing is one of the observations which may be made of an analysis by States of the particulars of steel shipments tabulated at length in THE IRON AGE of Feb. 19, page 539 and following. As is to be noted in that tabulation, the country was divided for the study of the steel shipments into four general sections. The Eastern section comprised 14 States; the Western, 17; the Southern, 15; and the Pacific Coast section, including Alaska, 4.

In supplementing the investigations of last week, the figures were collated by States. To ascertain their relative importance, all forms of rolled and finished steel were taken into account, except the following: Data on shipments of pipe and other tubular products were not available, as explained in the preceding article. The records of the shipments by the subsidiaries of the United States Steel Corporation of general forms of semi-finished steel were not included on the score that the States to which they were shipped represented in turn plants where the steel would be converted into the several forms of finished steel and be distributed in much the same manner as finished products were by the Steel Corporation itself. The figures for heavy rails were likewise eliminated partly because the point of destination on the lines of the railroad purchaser is no direct index of the actual distribution.

The year 1920 (one of the three years for which the information was available) was taken as being best for discovering broad cross-currents, being a year of fair activity. After deducting from the total production of that year for exports and for heavy rails and tubular products, there was a remainder of approximately 21,650 thousand tons of rolled steel carried to the 48 States, the District of Columbia and Alaska.

Assuming distribution in general would travel with some degree of parallelism to the distribution shown

AREAS in Black Represent to Same Scale the Amount of Steel Shipped on Domestic Account in 1920 into the Four General Sections of the Country. These areas are equal to the areas of the columns used to indicate the relative importance of the several individual States in the distribution of shipments. The areas with shaded edges represent how the four sections contributed to the production of the material distributed



for the Steel Corporation, making some allowance for territories more easily tapped by some of the independent steel companies, and estimating the production for each of the general divisions of the country, it is shown that the Eastern section alone made more than it consumed, 60 per cent more in fact, or nearly 6,000,000 tons in excess of the Eastern demand. The Western territory made barely one-half of what is absorbed, the Southern less than one-half and the Pacific Coast only one-fifth. The six million ton excess in the East went to balance the 4.3 million ton deficit in the West, the 900,000-ton deficiency in the South and 800,000 tons on the Pacific Coast. This is indicated in one of the tables.

The table of shipments to States shows the order according to the estimated tonnage distributed in each case, comprehending the same rolled products previously mentioned. Included in this table also is an approximation of the percentage that the shipments to each State bear to those to Pennsylvania, these relative figures being roughly the relation of the shipments in the Steel Corporation record and not necessarily the relation of the total tonnage estimated for each State. The chart on page 609 is based on this table and on the calculation of the share each section of the country had in rolling the steel.

Amounts of Finished Rolled Steel (Excepting Heavy Rails and Tubular Products) Shipped to Different States in 1920

State	Relative Amounts Pa.=100	Thousands of Tons	State	Relative Amounts Pa.=100	Thousands of Tons
Pa.	100	4,700	Ga.	2.5	100
Ill.	64.5	3,100	Me.	2	90
Ohio	46	2,100	Neb.	2	90
Mich.	35.5	1,750	Okla.	1.5	80
Ind.	30.5	1,500	Colo.	1.5	80
N. Y.	24.5	1,150	N. C.	1	50
Wis.	18	900	Fla.	1	50
N. J.	15	700	R. I.	1	50
Cal.	14.5	700	Ark.	1	40
Mo.	12.5	625	Utah	1	40
Mass.	8.5	425	Wyo.	0.5	30
Minn.	8.5	400	Mont.	0.5	25
Md.	6.5	310	Idaho	0.5	25
Tex.	6.5	280	N. M.	0.5	20
Ala.	6.5	270	S. C.	0.5	20
Va.	5.5	230	Miss.	0.5	20
Iowa	4.5	220	S. D.	0.5	20
Conn.	4.5	220	Del.	0.5	20
W. Va.	4.5	220	N. H.	0.5	15
Tenn.	4.5	180	D. C.	0.5	15
Wash.	3.5	165	Alaska	....	10
Kan.	3	150	Ariz.	....	10
Ore.	3	145	N. D.	....	10
La.	3	140	Vt.	....	10
Ky.	3	140	Nev.	....	10
		20,720			930

Sections	Probable Production 1000 Tons	Probable Production Per Cent	Apparent Destination 1000 Tons	Apparent Destination Per Cent
Eastern	16,000	74	10,025	46.5
Western	4,700	21.7	8,975	41.5
Southern	750	3.4	1,630	7.5
Pacific	200	0.9	1,020	4.5
	21,650	100	21,650	100

Colorado Plan a Distinct Step in Advance

Workmen Have, However, No Real Share in Determination of Wages, According to Report of Russell Sage Foundation Investigation

THE industrial studies department of the Russell Sage Foundation has recently finished its investigation of the industrial representation plan of the Colorado Fuel & Iron Co. In THE IRON AGE of Jan. 29, page 338, the synopsis of the report as to the mining industry of the company was published. The substance of this report was that, while much had been accomplished through employee representation, the plan is not a complete success.

The Russell Sage Foundation has now issued its report in regard to the operation of the employee representation plan in the steel plants of the company.

The report declares that through the Rockefeller employees' representation plan, the men in the steel works of the Colorado Fuel & Iron Co. were able to secure the actual 8-hr. day five years before the Steel Corporation and the rest of the industry adopted it, but points out that because this company feels impelled to follow the wage scale of its competitors, chief among which is the Steel Corporation, its workmen have no real share in the determination of their wages. This, the report says, limits seriously the scope of the employees' representation plan which in other respects has accomplished much good.

"In an industry so devoid of any tradition concerning representation of the workers as the steel industry is," declared Mary Van Kleeck, director of the Foundation's Department of Industrial Studies, "the industrial representation plan of the Colorado Fuel & Iron Co. marks a distinct step in advance; for under the plan the men in the steel works of this company secured such important gains as the actual 8-hr. day, an opportunity to participate in revising wage scales, a method of presenting and discussing grievances, and a greater degree of security in their jobs through the right to appeal to higher officials against the decisions of foremen and superintendents. When one looks at these accomplishments and then considers the methods of the United States Steel Corporation, one must conclude that at least in one small segment of the industry the wage-earners have been given a voice in determining the conditions under which they must work. Nevertheless, until the men throughout the industry as a whole secure adequate and effective representation in determining wage standards, those employed in any one plant such as the Colorado Fuel & Iron Co.'s steel works, are bound to be dissatisfied. Every week the steel workers in this company are reminded by their pay envelopes that the scope of their representation does not give them an effective share in determining their own earnings."

The lack of this representation in the determination of wage scales, according to the report was one of the principal reasons why the steel workers of this company walked out practically in a body when the national steel strike of 1919 was called, notwithstanding the fact that they had already enjoyed the 8-hr. day as well as several other conditions which the men in the rest of the industry so badly wanted.

Ben M. Selekman, who conducted the investigation for the foundation and prepared the report, a document of 293 pages, found that in the opinion of the workmen the most serious obstacle to the success of the plan is the minor local official, not the higher official. As long as the functions of "hiring and firing" are in the hands of superintendents and foremen, Mr. Selekman says, dissatisfaction will exist among the employees. Workmen repeatedly accused foremen of favoritism and of being arbitrary.

Norway's foreign trade forms the subject of an attractive 64-page booklet issued by the Trade Intelligence Bureau at Oslo, Norway, and sent out by the Norwegian Legation at Washington. The publication has many diagrams and some tabular matter detailing the main features of Norway's foreign commerce and, in addition, there are illustrations from photographs showing some of the features of interest in connection with that commerce.

COPPER FROM CENTRAL AFRICA

Production Already 12 Per Cent of American Total —New Refinery in Belgium to Handle Output

In the Katanga Province at the eastern end of the Belgian Congo district are copper producing mines which appear destined to interfere somewhat with exports of copper from the United States. At present most of the copper produced in this region is shipped to the United States for refining after receiving preliminary treatment in the district. Much of it then is shipped again across the Atlantic to European consumers.

However, as stated in THE IRON AGE of Jan. 22, a copper refining plant is under construction by the Société Générale Metallurgique de Hoboken, at Oolen, Belgium, which is to receive its copper direct from the Congo district, from which it is shipped out by railroad through the port of Beira, on the Indian Ocean, almost due south of Lake Nyassa. In reaching the sea coast, the copper traverses, in succession, Northern Rhodesia and Southern Rhodesia, both under the British flag, and Portuguese East Africa, Beira being one of the principal ports in that Portuguese Colony and located about 150 miles southwest of the mouth of the Zambezi River.

In the Feb. 7 issue of *Engineering and Mining Journal*, recent figures are given for the production of the Union Miniéré du Haut Katanga, the great copper mining company of the Congo district. In 1924 this company turned out 188,853,000 lb. of copper, which is nearly one-eighth the production of the United States during that same period. August showed the largest total, with 20,405,000 lb., or almost precisely 15 per cent of the American copper production in August.

After the completion of the new plant in Belgium the crude copper from the Congo will go directly to Europe, instead of crossing the Atlantic twice, for refining in the United States and then shipment to the consumer. This will conserve ocean transportation and presumably save costs, not only in carriage but also because of the low rate of wages in Belgium, as compared with those in the United States, which should make the Belgian product considerably cheaper than the American.

To what extent the future development of the Belgian mines will grow under these conditions is problematical. The article above mentioned states that there seems to be nothing to prevent the company from producing 240,000,000 lb. of copper in 1925, if that be desired. The ore reserve is placed at not less than 75,000,000 tons, averaging 6 per cent copper. Hence the rate of production apparently is under control of the management, as influenced by market conditions.

Appeal to Manufacturers to Help in Preventing Waste

WASHINGTON, Feb. 20.—An appeal to the manufacturers of the country included in its membership to support the campaign for the elimination of waste in industry by means of simplification and standardization of products was issued today by the department of manufacture of the Chamber of Commerce of the United States.

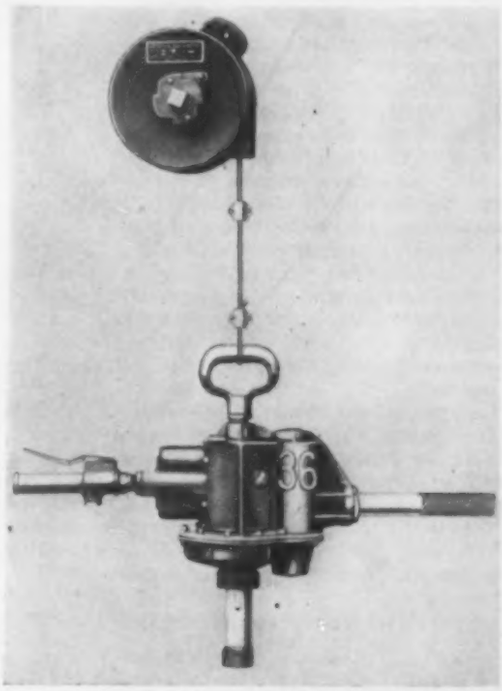
"Notwithstanding the very evident gains and economies which are certain to accrue from a reasonable application of simplified practice," says the appeal, "it is surprising that numerous lines have as yet taken no very definite steps in this direction. The Department of Commerce, the American Engineering Standards Committee and the National Chamber have been and are working to the best of their ability to arouse those lines to the point of determining upon some action."

The department cites a long list of simplification projects successfully carried out. As a typical example of the results achieved, it gives the testimony of one line which reports that on one raw material item alone it has scaled down the average inventory from $100,000 to $20,000 without decreasing production and has increased production in certain departments from 10 to 25 per cent.

Balancer for Portable Tools

The device here illustrated, known as the Pedwyn balancer, has been designed for suspending, balancing or lifting pneumatic and electric portable tools, eliminating much of the fatigue incident to the operation of such tools.

It is intended to replace the usual method of counterbalancing, which consists of installing an overhead sheave with a rope or cable to which one end is fastened to the tool and the other end to a counterweight. In this arrangement of balancing the placing of guards around the counterweights, usually required by safety codes or laws, is necessary. Being self-contained, the Pedwyn balancer may be more conveniently installed, and the use of a counterweight and its guard are eliminated. It may be reinstalled conveniently in various locations, and may be suspended on a trolley or track over a conveyor, permitting the portable tool to be traversed in a longitudinal direction. When thus suspended and balanced, the damage of the spindles of drills and grinders from falling to the floor is prevented.



Balancer for Portable Tools. The device is self-contained and may be installed conveniently. The use of a counterweight is unnecessary

Two sizes of the device, which is being marketed by the Chicago Pneumatic Tool Co., 6 East Forty-fourth Street, New York, are available. The capacity of the No. 1 size ranges from 10 to 50 lb., and of the No. 2 size from 50 to 100 lb., both being adjustable for intermediate loads within the range of their respective capacities.

A maximum-demand attachment recently developed for use on the horizontal polyphase watthour meters of the Sangamo Electric Co., Springfield, Ill., permits energy, kilowatt-demand and power-factor readings to be taken on the same meter. This attachment as well as the maximum-demand attachments for the company's single-phase and vertical polyphase watthour meters are now available with a contact device which will ring a bell or give some other suitable signal, when the demand during any time interval reaches a certain predetermined value.

Refractory Problems in the Foundry

Brick for Cupolas, Malleable Furnaces and the Open-Hearth Discussed at a Symposium of the American Ceramic Society

REFRACTORY problems of the gray iron and malleable foundry and of the open-hearth furnace were discussed at the twenty-seventh annual meeting of the American Ceramic Society held at Lord Hall, Ohio State University, Columbus, Feb. 16 to 24. In connection with this meeting the university celebrated the thirtieth anniversay of its establishment of collegiate training in ceramic science and engineering.

Symposium on Foundry Refractories

One session of the refractories division was devoted to a symposium on "Refractories as Related to Foundry Practices." This was a joint session of this division and the committee on refractories of the American Foundrymen's Association. This meeting, which took place Feb. 19, continued through the morning and part of the afternoon. Following the presentation of papers on refractory problems in the foundry the same subject in its relation to the steel industry was taken up. The meeting was well attended, but largely by representatives of the refractories industry.

There were quite a number of foundrymen present, but very few operators of open-hearth furnaces. Men of prominence in the foundry industry were on the program and had prepared papers of a great deal of interest, but were not present in person, their papers being read and printed copies distributed. While the papers brought out considerable interesting discussion, it is probable that some of the subjects would have been discussed more fully had the authors of the papers been present.

The symposium was presided over by George A. Bole, Columbus, United States Bureau of Mines, who said that the purpose of the symposium was to bring manufacturers and users of refractories together. He referred to what had been accomplished by the American Foundrymen's Association toward standardizing foundry sands and believed that similar cooperation by refractory manufacturers and foundrymen would bring good results.

Iron Foundry Refractories

Dr. Richard Moldenke, who was not present, submitted a paper on "Refractory Requirements in the Gray Iron Foundry." One of the outstanding parts of this paper was its reference to a new method of lining cupolas that has been developed in Germany and which he predicted would shortly come into use in this country.

Dr. Moldenke's criticism of the refractory manufacturer for not studying the foundry refractory problems on the ground with the view of making improvements was answered, in a brief discussion that followed, by the statement that refractory makers have a committee on industrial survey, a subcommittee which looks after refractories for foundry use, and that this committee had been unsuccessful in its efforts to get data from foundry associations. One great trouble from the foundry standpoint, it was pointed out, is in educating foundrymen and reference was made to the efforts to get to the foundrymen through the press and technical papers. A refractory man declared that refractory makers are not in a position to conduct research experiments and that foundrymen can conduct such work. The discussion also brought out that foundries often want brick in a hurry and take any that may be handy, and that many foundries, particularly small ones, use only one quality of brick for lining various zones of the cupolas and ladles when it would be better to have three kinds. Better results were declared to have been obtained by using a hard, dense, cheap brick for ladles.

Later in the session the subject of cupola brick was again brought up by W. D. Griffiths, Lavino Refractories Co., Philadelphia, who said foundrymen want one type of brick that can be used for the top and bottom of cupolas. If foundrymen would permit experimentation along that line he believed good results would be accomplished. He referred to one large foundry that uses a very dense brick for all purposes and to another that insists on a blast furnace type of brick for all work, which he said is a mistake.

Cupola Practice and Life of Brick

"The Effect of Variations in Cupola Practice on the Life of Refractory Bricks" was discussed in considerable detail in a paper prepared by James T. MacKenzie, metallurgist American Cast Iron Pipe Co., Birmingham. This paper was not read in full, but particular attention was called to certain parts of it. One of these related to the time allowed by the working conditions of the foundry for getting the furnace ready for the next heat. The author said that, in plants using short melts, this is of little concern, but where the cupola is run all day and must be ready for charging early the next morning, there is a temptation to put the men to work as late as possible and rush the work. This usually results in a poor job in chipping and daubing and the charging is done helter-skelter. He believed it would be better to have a separate shift to get the furnace ready at night so that there is time to do the job well. This often requires the cooling off of the walls with a hose which probably injures the lining, but good blocks stand this treatment remarkably well.

Another operation phase dwelt on was blast. The writer declared that far more damage is done to linings and castings by too much blast than not enough, and he referred to oxidation of the iron and other troubles that result from high pressure. In conclusion he said that in one point only does good foundry practice work against the lining and that is high temperature. He believed it far better to melt iron hot and cool with scrap than to court disaster by melting cold. In fact, he doubted whether correct melting would attack a lining any faster than cold melting on account of the increased chances of oxidation in the latter. He believed the finest thing that could be done would be the elimination of oxidation in the cupola, the price of which is vigilant application of fundamental principles and painstaking attention to routine. In the discussion Mr. Bole called attention to the fact that the Bureau of Mines had issued a bulletin on cupola temperatures several years ago.

Refractories in the Malleable Foundry

The next paper submitted was one on "Principal Refractory Problems of the Malleable Cast Iron Foundry" prepared by H. A. Schwartz, head of the research department of the National Malleable & Steel Castings Co., Cleveland. He pointed out that, in the air melting furnace, such combustion conditions are required that the final products will contain little or no free oxygen and a small percentage of carbon monoxide. In operation the temperature of the furnace walls is approximately 3000 deg. Fahr. If the thermal engineer seeks to minimize radiation allowance by using very thick walls, the inner face of the wall grows hotter as the cooling action of the exterior has diminished and he buys fuel economy at the expense of refractory economy. In side walls, thicknesses of from 18 to 9 in. are in use, but the author said that the best economy in both fuel and brick with which he was familiar was ob-

tained on furnaces with 12-in. walls. He saw no promise of merit in heat insulation which he said would probably result in the rapid destruction of the inner refractory linings. Air furnaces will survive more hot hours if allowed to cool overnight than if operated continuously.

Erosion by flue gases is an important source of wall destruction. Most furnaces use top blast and if the streams of air are so directed as to strike a wall, the brick is rapidly cut out by a combination of melting and erosion. The writer also pointed out that the character of fuel is of importance. He said that pulverized coal has an advantage in that the burning mass travels along the length of the furnace and hence need not impinge on walls or roof at its point of maximum temperature. There is now a feeling that both pulverized coal and oil are less destructive to furnace linings than is hand-fired coal, but he doubted whether this is capable of rigid proof.

Mechanical difficulties in roofs were also mentioned, with the statement that too round an arch results in an unfavorable flame distribution and a too flat one imposes too high stresses on the bung frame. The life of the bung is influenced by its mechanical rigidity, according to the author, who said that within his knowledge a mechanically more stable design more than doubles the bung life. Where crane service is available he regarded the 24-in. bung as the more economical.

Some of the artificial refractory minerals such as spinel, sillimanite, etc., hold theoretical advantages, but at present they seem to lack resistance to thermal stresses. If the problem be viewed merely as a reduction in the amount of refractories used and not the interruptions in service for repairs, the author said the thin-walled, artificially cooled furnace might furnish a solution at an undetermined increase in fuel cost. However, he doubted whether the various variables he had alluded to could be combined in an equation from which the most economic practice could be calculated. It is much more likely, he said, that the operating executive will continue to arrive at his results by a process of trial and error in an attempt to find the fuel, refractory and design which reduces his costs for labor, material, interruptions and service, etc., to a minimum. He believed that in the present state of the art the ceramists' efforts may be most profitably applied to improve the resistance of side walls to the chemical actions of slags and of bung brick to mechanical destruction by thermal stresses and perhaps the stresses applied by the bung frame. So far the best solution seems to have been based on using very dense brick for the former and coarse open brick for the latter.

During the discussion one speaker said that, finding 12-in. side walls unsatisfactory in a reverberatory furnace, he had changed to 21-in. wall thickness and doubled the furnace heats to 22. Another pointed out that insulating the side walls reduces the crown temperature and he thought the next step would be to try out insulating the walls. Another favored the use of large bungs up to 24 or 36 in. wide or as large as can be conveniently handled.

Refractory Problems in Steel Foundries

"The Principal Refractory Problems of the Steel Industry" was the subject of a paper by Dana T. Demorest, professor of metallurgy, Ohio State University. First taking up the subject of brick for the roof and side wall of an open-hearth furnace he said that the problem is more one of manufacture and technic than of materials. Silica brick is used for roofs and side walls because of their ability to keep their crushing strength at high temperature. In this they are different from fire clay brick, although their melting temperature is not higher than that of first grade fire brick. Magnesite brick is unsatisfactory for roofs and side walls because it does not maintain its crushing strength and because of its tendency to slack. Probably the chief trouble to which silica brick, especially in the roof, is subject is spalling and, in addition in the basic furnace, the brick are being continually fluxed by the spray of iron oxide and basic slag, both of which attack silica brick. This attack cannot be prevented, but it can be minimized by making the brick as dense as possible and by so laying up the roof that there are as few places as possible for the spray of these fluxes to accumulate. He suggested a more careful study of the proper proportion of grain and sizes in the manufacture of silica brick so as to get the densest possible brick.

The speaker declared that the life of a roof of silica brick can be enormously prolonged if the brick is accurately made in machine presses. He said that an open-hearth furnace in a Columbus foundry had been in use a year with no roof repairs and is still in good condition. Later during the discussion he said that the roof in this furnace has lasted only six months when machine made brick was not used. While one reason for the long life of this furnace was its intelligent operation, another was because of the use of machine made brick with very true surfaces. This permitted the laying of the roof with a minimum amount of cement. Since the most easily fluxed material in a roof is the cementing material and the brick next to it, a roof made with accurately made brick and a minimum amount of cement is bound to stand up better.

The spalling of the silica brick, the author said, is due partly to the manufacturing processes not being sufficiently prolonged and at an insufficiently high temperature to bring about the inversion of the quality of its invert forms as much as possible. Certain bonding material such as oxide and lime hasten the inversion better and the more completely the inversion has been carried out in the manufacturing processes the less danger there is of spalling in the roof. Spalling is also greatly reduced by using accurately made brick because the pressure on the brick is more uniform.

The standard basic material for open-hearth bottoms is magnesite, both in the form of bricks and in grain magnesite. The top layer or working bottom is usually made of a burnt-in layer of dolomite because it sets more quickly. In some furnaces a layer of chromite is burnt in near the slag line, on the neck and on front and back walls. The speaker declared that magnesite is ideal in its resistance to basic open-hearth slag, especially when the top layer or working bottom contains enough chrome ore or iron oxide so that it is pretty well saturated with these oxides and will not take up more in use and hence will not swell or shrink and develop cracks. After patching the neck and breast of the furnace at or near the slag line with granular burnt dolomite, the effectiveness of the refractory is helped by covering it with chrome ore.

The life of a foundry open-hearth is greatly prolonged by using chromite after patching with dolomite. The checker work brick, the speaker pointed out, are subjected to severe scoring action of the slag spray and he suggested that the top brick, where the action is severest, be made of a more neutral type of refractory than fire clay. It might be advisable to make a top layer of chrome or die-made brick, especially when powdered coal is used and much ash is lodged on the checker work brick.

In conclusion he said that the real problem which needs solution in the case of checker work brick for an open-hearth, and also for a blast furnace, is to find a brick with the greatest ability to absorb heat from high temperature gases and to return it to low temperature gases. This is a problem for the ceramic engineer.

Discussion on Roofs and Bottoms

A discussion of both open-hearth roofs and bottoms followed the presentation of the paper. The opinion was expressed that the life of an open-hearth furnace might be prolonged from 100 to 200 days if spalling is reduced. It was pointed out that the parts of the roof that gave out first are the slope and the corner under the arch. Suggestions for roof improvements included the use of suspended roofs and interlocking tile as well as machine made brick, and the need of preventing the loss of the glazed roof surface because of brick was emphasized.

L. S. Longenecker, Vitrefrax, Inc., explained the use of interlocking arch tile for roof construction. He pointed out that an outstanding trouble with ordinary roofs is that pieces break off and drop, leaving the

faces of the adjoining brick exposed. Difference of opinion was expressed regarding furnace bottoms. One speaker said he had seen a magnesite bottom taken out after 20 years' service and its life is usually seven to ten years, so that he was not interested in dolomite bottoms, but another declared that he had found dolomite bottoms better and would not use magnesite bottoms again.

Open-Hearth Furnace Bottoms

The subject of furnace bottoms was dwelt on briefly by the last speaker, William J. McCaughey, professor of mineralogy, Ohio State University, whose subject was "Microscopic Examination of an Open-Hearth Steel Bottom." He said that up to the war magnesite open-hearth steel bottoms had been generally used, but as Austrian magnesite was no longer available, American iron-free magnesite came into use and this was generally successful in open-hearth bottoms, but not so satisfactory in brick making. He referred to an unusually good furnace bottom made of Canadian magnesite used in one of the open-hearth furnaces of the Donner Steel Co. After 200 heats had been taken there was not a hole in the bottom. He secured a piece from this bottom for a chemical and microscopic examination and found that the composition had changed, the 16 per cent of lime having been reduced to 4 per cent and the silica having dropped to 2 per cent. The material had recrystallized and had formed a monolithic bottom.

In connection with the convention there are two exhibits, one by the Ohio manufacturers of ceramic products and the other by makers of various equipment used in the ceramic industry. Trips were made to the plants of the Ohio Malleable Iron Co. and the Buckeye Steel Castings Co., Columbus, the American Rolling Mill plant in Middletown and to various Ohio plants engaged in ceramic industries.

FABRICATED STEEL PLATE

Detailed Bookings for Two Years Compiled by Bureau of the Census

WASHINGTON, Feb. 24.—The Bureau of the Census, Department of Commerce, has issued a revised statement concerning bookings of fabricated steel plate. The original statement, the first of a series of monthly reports for this unit of the industry, was incorrect as it related to the percentages of capacities reporting, and also as it concerned total bookings by months, for 1923 and 1924, and further as it related to bookings for stocks and miscellaneous sources of consumption. The figures as they related to bookings for other purposes, such as oil storage tanks, etc., were correct. The revised statement says that total bookings of fabricated steel for 1924, representing 43 per cent of capacity and based on reports from 30 identical firms, including one firm now out of business, amounts to 304,187 net tons. This compares with 532,805 tons booked in 1923 by the same firms, representing 76 per cent of their 1923 capacity. The revised statement in detail follows:

Fabricated Steel Plate Bookings (Net Tons)

	Total	Oil Storage Tanks	Refinery	Tank Cars	Gas Holders	Blast Furnaces	Stacks Etc.
Jan.	60,382	38,917	3,629	1,935	2,493	328	13,080
Feb.	55,927	36,669	2,553	3,344	2,569	425	10,367
March	68,228	41,144	1,291	3,948	4,783	709	16,353
April	54,321	20,924	2,579	2,141	6,481	268	21,928
May	34,162	16,511	1,381	2,620	1,825	849	10,976
June	56,031	38,351	956	3,252	2,514	699	10,259
July	55,242	34,330	1,146	3,492	4,909	945	10,420
Aug.	33,138	15,498	1,314	2,829	2,406	746	10,345
Sept.	36,267	23,634	480	1,130	1,435	736	8,852
Oct.	31,603	15,589	912	2,238	5,512	1,073	6,279
Nov.	25,445	9,503	312	1,223	6,378	750	7,279
Dec.	22,059	6,718	212	239	2,571	715	11,604
1923 Total.	532,805	297,788	16,765	28,391	43,876	8,243	137,742
Jan.	19,675	4,012	729	99	7,934	632	6,269
Feb.	15,498	2,393	895	134	4,700	505	6,871
March	21,057	4,757	1,590	425	3,917	334	10,034
April	19,099	6,342	999	366	1,630	710	9,052
May	24,872	5,137	1,322	336	6,448	693	10,936
June	28,511	15,816	879	52	2,606	640	8,518
July	21,248	11,360	850	93	657	461	7,827
Aug.	29,351	15,927	1,031	322	706	363	11,002
Sept.	19,430	10,286	627	284	1,128	520	6,585
Oct.	23,113	7,868	1,352	530	1,536	1,929	9,898
Nov.	36,937	13,098	241	8,987	5,206	103	9,302
Dec.	45,396	26,449	757	1,345	5,769	2,508	8,568
1924 Total.	304,187	123,445	11,272	12,973	42,237	9,398	104,862

Pumping Oil with Centrifugal Pumps

Tests of two centrifugal pumps used in California in pumping oil are reported in a pamphlet just issued by the Goulds Mfg. Co., Seneca Falls, N. Y., maker of the pumps. The report is made by Prof. R. L. Daugherty, of the California Institute of Technology, and consists in the main of curves of characteristics of the pumps when handling water, gasoline, light crude oil, heavy crude oil, warm residuum and cold residuum. The petroleum products handled range from the fluidity of gasoline to as high as 7000 Saybolt viscosity. The charts should therefore be of assistance in determining the performance of centrifugal pumps in handling viscous liquids.

One of the pumps used was a 4-in. single-stage volute centrifugal pump, while the other was a 5-in. 3-stage turbine centrifugal pump. At maximum efficiency the single-stage pump, running at 1450 r.p.m., had a capacity of 600 gal. per min., at a head of 142 ft. of water, and the 3-stage pump a capacity of 450 gal. per min., at a head of 343 ft.

Senator Reed Indorses Present Law as to Immigration

WASHINGTON, Feb. 24.—Approval of the present immigration law given by Senator Reed, Republican, of Pennsylvania, is looked upon as being a reply to efforts of the Department of Labor to have the law so amended that it would apply quota application to contiguous territory of the United States so as to include Canada and Mexico. Also the Department of Labor is anxious to have adopted a system of registration of aliens. There can be no doubt that the proposed legislation of the Department of Labor is gaining in favor. But Senator Reed apparently is opposed to it because he said that smuggling has been on comparatively small proportions. The present law, he declared, has brought about the three primary purposes for which it was intended, including uniform distribution of immigration, apportionment of quotas more in accordance with the national characteristics of the United States, and a sharp reduction in the number of arrivals.

"I think we can fairly say, for the first time in 75 years, that the problem of European immigration to America has been settled, with a net gain at the rate of less than 40,000 annually, and all of that net gain coming from northern and western Europe, mostly people who speak our language before they get here, mostly people who have inherited from their forbears a capacity for self-government," said Senator Reed. "I think we can say that for once and all the problem of European immigration is settled."

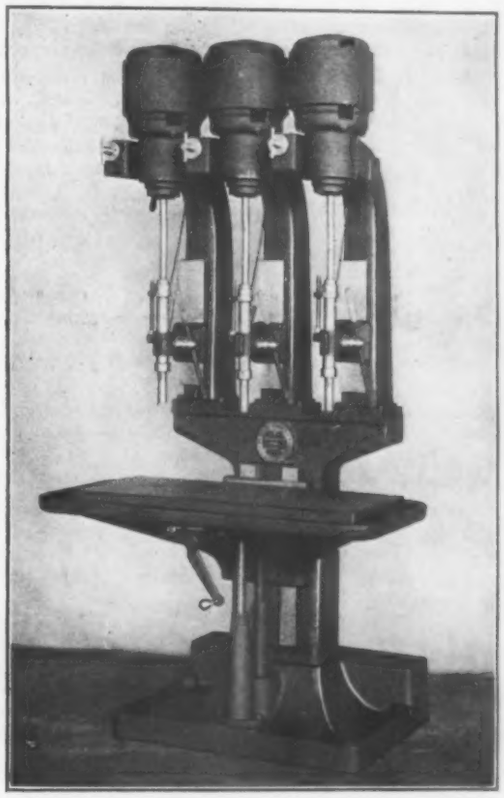
Quad City Foundrymen Meet

The Quad City Foundrymen's Association held its regular monthly meeting at the Davenport Chamber of Commerce, Davenport, Iowa, Monday evening, Feb. 16. George A. T. Long, Pickands, Brown & Co., Chicago, read a paper on cupola construction and operation, and discussed the effects of various elements in cast iron. The paper was based on many years of experience and observation in connection with many kinds of cupola operations, as well as the mixing of many different kinds of gray iron.

W. D. Moore, president, American Cast Iron Pipe Co., Birmingham, Ala., was a guest at the meeting, and in the discussion told of some of the peculiarities and difficulties attending the casting of cast iron pipe.

Sensitive Drills with "Motorized" Spindles

The motor-spindle ball-bearing sensitive drilling machine, illustrated herewith, is stressed by the makers, the Leland-Gifford Co., Worcester, Mass., as representing a distinct novelty in motor drives for drilling machines because the spindles themselves are "motorized." An advantage claimed for this form of drive is unusual flexibility. The research work in the design and developments of the motors is said to have been extensive, as well as tests on applying this form of drive.



Unusual Flexibility Is Claimed for the "Motor-Spindle" Arrangement of the Sensitive Drill Shown Above

These machines are available in the usual sizes of 14 in. and 20 in. swing, in spindle combinations of one, two, three, four and six. In their simplest form they are equipped with lever feed to the spindle, with four open motor speeds and arranged for dry drilling. The machines are easily adapted for semi-automatic power feed, back gears to the spindle, giving four additional speeds with correspondingly increased power to the spindle nose. Equipment for wet drilling may be included also. The machines are full ball bearing, with mountings that assure ample lubrication and protection from dust.

An alternating current, 220-volt, 3 phase, 60cycle motor is employed, and provision is made through small compact transformers for handling other line voltages. Four motor-spindle speeds, 600, 900, 1200 and 1800 r.p.m., are obtainable through a special five-position drum-type controller. The controller may be manipulated conveniently and the various speeds are plainly indicated.

The rotating member of the motor, the rotor, is of the cast type, in which wires are not used, and therefore trouble from loose wires is eliminated. This motor is mounted on a quill carried on ball bearings. It is claimed that with its freedom from commutator and brushes, the life of the motor with ordinary care is practically indefinite.

The Gulf States Steel Co. has purchased 85,000 acres of coal lands from the Bessemer Coal, Iron & Land Co. for future development. The lands are in Tuscaloosa and Fayette Counties, Alabama, and the mining will be of the deep kind.

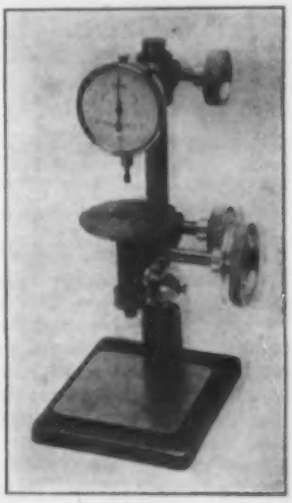
Dial Bench Gage with New Features

Provision for raising the work-carrying table against the indicator spindle by means of the foot, leaving both hands free for inserting the work to be gaged, is one of three features claimed as new for the bench gage shown in the accompanying illustration.

The knurled handle for raising and lowering the work table is grooved, as shown. In this groove there is a drilled hole in which a cord or wire may be inserted and run over the groove to the floor, permitting of operation of the table with the foot. The travel of the table may be adjusted by turning the knurled adjusting nuts beneath the table. Foot operation is of particular value, perhaps, in locating odd-shaped parts upon the table. For hand operation the cord may be removed conveniently.

Another feature is the provision for gaging long stock. By unloosening the clamping screw the table may be swung out of the way and the base of the gage itself used as a table for gaging larger pieces than can be accommodated on the usual gage of this type. To permit the work to be inserted between the indicator spindle and the base of the gage, the small button on the top of the indicator is lifted by the fingers.

It will be noted that the usual lever attachment on the indicator to raise and lower the spindle from the work is not employed, the work table being brought up to the spindle instead. The makers, the Federal Products Corporation, Providence, state that although they manufacture the other type of machine, tests have shown that more uniform readings can be obtained by the method used in the gage illustrated, and that less wear takes place in the indicator. The gage may be operated by raising the spindle of the indicator and locking the table, however, by means of the small button on top of the spindle.



The Knurled Handle for Raising or Lowering the Work Table to the Spindle May Be Operated by the Foot. The table may be swung aside for measuring long stock, which rests on the base. The dial indicator is of larger diameter than usual

The graduations on the indicator, which has only 0.030 graduations to one turn of the hand and is also graduated in 0.0005 in., as shown by the lines between the dial, is the third feature. The indicator is 2¾ in. in diameter, which is claimed to be larger than usual, the increased diameter being stressed as increasing the distance between the graduations, which facilitates reading.

The gage is designated as Model No. 35. The post on which the table and indicator are clamped is regularly 12 in. high, but posts of other heights may be furnished.

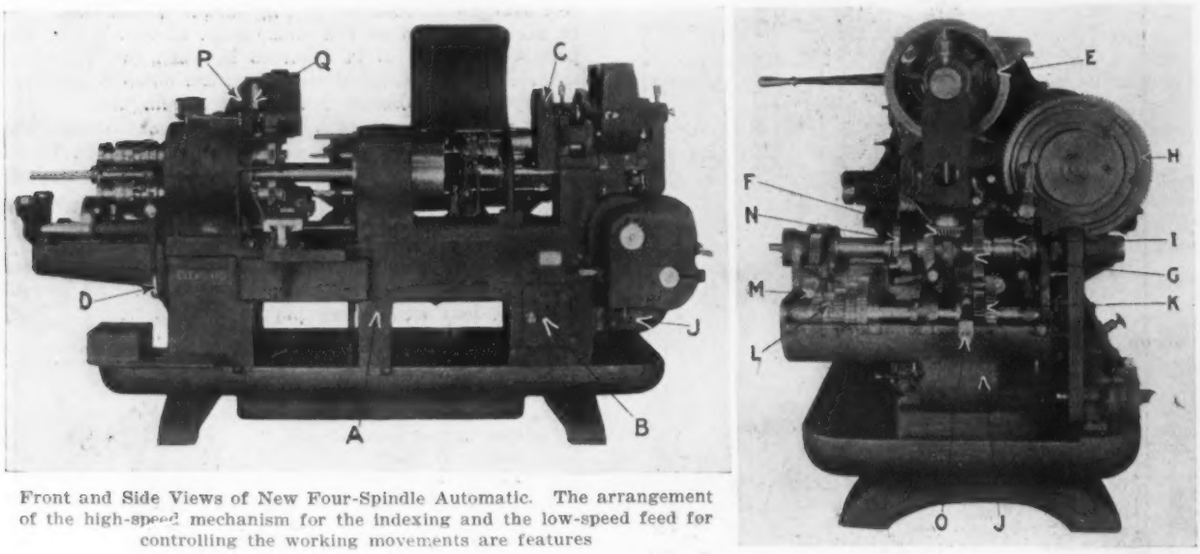
Domestic sales of oak leather belting reported by the Leather Belting Exchange, which represents about 60 per cent of the total, amounted in January to 409,252 lb., valued at $686,316, or an average of $1.68 per lb. This is a considerable increase over the December figures of 324,263 lb. and $547,681, the average being $1.69 per lb. In January, 1924, sales were 441,266 lb., $752,213 and $1.84 per lb.

NEW FOUR-SPINDLE AUTOMATIC

Compact Machine with Features Designed to Facilitate High Output

Permanent alinement and rigidity, which are important in maintaining high output of work within close limits, as well as convenience in control and adjustment were set up as primary considerations in designing the four-spindle automatic screw machine shown in the accompanying illustrations.

The capacity of the machine, which has been recently brought out by the Cleveland Automatic Machine Co., Cleveland, and is designated as the Model M, is for 1½-in. round, 1¼-in. hexagonal, and 1-1/16 in. square stock. Compactness is a feature, the machine occupying a floor space of 42 x 116 in. Many details incorporated in the company's single-spindle automatic have been applied to the new machine.



Front and Side Views of New Four-Spindle Automatic. The arrangement of the high-speed mechanism for the indexing and the low-speed feed for controlling the working movements are features

Ample chip room is a feature, liberal space having been provided between the tools and the chip pan. Additional provision for chips has been made by arranging the bed casting of the machine so that when the space under the tools has been filled, further accumulation of chips is deflected by an inclined surface inside of the bed at the top of the center legs, shown at *A*. Chips thus deflected slide across into the compartment at the right of these legs. Spindle-change gears are kept in a cabinet cast in the bed, the door of this cabinet being shown at *B*. Seven changes of speed, from 210 to 751 r. p. m. are provided, the change gears being contained in case *C*. A knurled steel guard which is screwed onto the spindle turret, is intended to keep dirt and chips from getting into the spindle mechanism, and may be quickly removed facilitating the changing of chucks.

Compression collars are provided on the spindles to take care of the variation in dimensions of materials. The spindle bearings are made up of hardened steel bushings mounted in the spindle turret housing and bronze bushings pressed on the spindles. Adjustment is provided for taking up wear in the front spindle bearings and also spindle end motion.

One of the features intended to facilitate operation is the lever shown at *D*, for opening and closing the chucks. As shown, the lever is shown hanging down, out of the operator's way. When a new bar of stock is to be put into the chuck, or when for any other reason the chuck is to be released, this lever is swung into a horizontal position, in which the rear of the lever enters the space between the two flanges on the chuck-operating thimble; the hand lever is then swung sideways to open the chuck. When stocking up the machine, the spindle turret is indexed to bring successive spindles into the position where they can be engaged by this hand lever.

A feature especially stressed by the makers is the arrangement of the high-speed mechanism for effecting indexing movements, and the low-speed feed for controlling the working movements of the machine. Two complete sets of gears are provided for these two movements. The method of accomplishing the high-speed and idle movements may be noted from the side-view illustration. Power is transmitted from the driving pulley *E* through bevel gears and a vertical shaft to another pair of bevel gears shown at *F*. The drive is then through spur gears *G* to a worm which meshes with the wheel *H* on the feed cam shaft. These high speed gears run continuously, but when the indexing movement has been accomplished the clutch shown at *I* is tripped automatically by the adjusting pins on the face of worm wheel *H*, thus interrupting further transmission through this drive.

The low-speed drive for the working feed movements is taken from the spindle driving gears, all feed movements, as expressed in inches per spindle revolution, remaining constant even with the changes in spindle speed. From the spindle change gears in the case shown at *C* in the front view illustration, power is transmitted through gearing to bevel gears, which in turn drive a vertical shaft. At the lower end of the latter shaft there is a worm meshing with a wheel in case *J*. From the worm wheel the drive is through either of two pairs of selective sliding gears K and then through a cone of spur gears *L*, an intermediate gear controlled by lever *M* and finally to a cross shaft upon which is mounted the ratchet *N*. The low-speed drive also runs continuously, but when the high-speed is thrown out a spider fastened to the back of lower bevel gear *F* stops automatically, this permitting the ratchet *N* to engage the pawl. The low-speed movement then becomes effective, power being transmitted through to the worm meshing with the feed wheel *H*.

Ten changes of feed are available. The cam shaft of the machine extends along the back of the machine, and the accessibility for adjustment of all cams and other parts of the mechanism is a feature also stressed. In lubricating, the oil is carried from the pump by individual tubes to the various tool points, piping above the turret having been eliminated. The oil piping is of telescopic type, moving with the tools as the latter advance to or recede from the work. The machine is equipped with both roughing and finishing slides, the latter being carried by bracket *P*. A cut-off slide is also provided. The cam action on the sliding plate *Q* is mounted so as to eliminate vibration from forming operations.

Either belt drive or individual motor drive may be furnished. The turret holes are 1½ in. in diameter.

Ingot Soaking Pits Heated Electrically*

Reduced Scale Loss—Comparisons with Fuel Heating on Energy Required, Including Rolling Process—Space Required

BY T. F. BAILY

THERE has been a belief that electrically heated soaking pits could not compete with gas-fired equipments. While it was generally conceded that electric pits would reduce the scale on the ingots, the opinion was also general that it was necessary to scale ingots heavily in order to produce a good surface on the bloom. These contentions remained somewhat open questions until the installation of an electric pit at the plant of the Donner Steel Co. at Buffalo in March, 1924.

Since that time, several hundred ingots of both carbon and alloy steel have been put through this pit. A comparison of these ingots with other ingots of the same heats put through gas-fired pits, together with a description of the electric pit, is the subject matter of this paper.

The electric pit is of 150 kw. electrical capacity with the outside dimensions approximately 8 ft. wide by 9 ft. long by 10 ft. high, with internal dimensions 3 ft. wide by 5 ft. long and 8 ft. deep, holding two 6800-lb. or 7400-lb. ingots. The electric heating is accomplished by means of carbon resistors, using crushed carbon of approximately ¼-in. mesh contained in troughs made of carbide of silicon. This type of resistor is the only one so far developed that can operate successfully at temperatures to be met with in soaking pit practice. The power input is controlled by means of special transformers having a number of voltage taps on the secondary, each tap giving a different kilowatt input to the furnace.

The resistor units are located in the side walls of the furnace, in such a manner that the ingots cannot come in contact with them, the slap of the ingot in charging being taken care of by heavy firebrick walls projecting beyond the resistor troughs. While the pit has been in service several months, no repairs have been required to these walls nor to the cover, the brick of which is in perfect condition, although heating ingots to a temperature of 2350 deg. Fahr. or above, and, at times for experimental purposes, to temperatures up to 2600 deg. Fahr.

The transformer equipment consists of a 150-kw. Packard 25-cycle, single-phase transformer, which was sometimes called upon to carry 50 per cent overload continuously. The meter equipment comprises a Weston indicating wattmeter, a Westinghouse graphic recording wattmeter, and Brown rare metal couple graphic recording pyrometer with the couple located in the cover of the pit directly above the ingots. The temperature readings were checked by means of a radiation pyrometer, which instrument was also used to take the temperature of the ingots going to the pit, when they were on the way to the mill after leaving the pit, and while they were in the mill.

As the blooming mill is steam driven, it was not possible to obtain readings of relative power requirements in rolling between electric and gas-heated ingots, but the finishing mill was electrically driven and the comparative results on rolling, given in Table No. 1, are taken on this mill. Had it been possible to take similar readings on the blooming mill the relative difference in power readings between the gas and electrically heated ingots would, no doubt, have been even more marked.

The loss of metal due to scale was determined by means of an ingot scale located at the entrance of the blooming mill, ingots of both the gas and electric pits being weighed after stripping and before charging in the pits, after heating and before rolling, and finally after the fourth pass in the mill.

Power Required for Heating

While it was not possible, on account of plant conditions, to operate the electric pit to the best advantage except on a few occasions, the power consumption for heating was well within the figures made before the equipment was installed. For instance, during the month of November, 101 ingots of an average weight of 3.3 gross tons each were heated. During this period the power was on the pit 624 hr., but the ingots were in the pit only 92 hr., the pit under these conditions operating at only 15 per cent capacity. Even under such conditions, the total power consumption was only 189 kwhr. per gross ton of metal heated.

Taking the average practice, however, between Nov. 16 and Dec. 2, charging the pit with power only during the time ingots were in the pit, the power consumption was 80.4 kwhr. per ton of ingots heated when heating two 3.3-ton ingots at a time to an average temperature of 2316 deg. Fahr., the skin temperature of the ingots charged being 1660 deg. Fahr.

During the period mentioned above, on account of mill conditions it was necessary to hold the ingots in the pit on some occasions as long as 16 hr. 40 min., while under the best conditions the time in the pit was only 1 hr. 40 min., although it was found that an average period of 2 hr. was quite sufficient for ingots charged at a skin temperature of 1600 deg. Fahr. and heated to 2350 deg. Fahr.

Had it been possible to operate the pit continuously on a 2-hr. soaking schedule, the power consumption would have been considerably under 75 kwhr. per gross ton, as occasional daily operation showed power consumptions under this figure. It should be kept in mind that the heat loss through the walls of this small pit was large compared with the heating capacity of the pit, and that a full size pit of four 6 x 8-ft. holes would show much better economy.

From a careful check on the wall loss of this pit during the period mentioned, of the 75 kwhr. used for heating, approximately 30 kwhr. were chargeable to wall loss, leaving 45 kwhr. as the heat actually required for the steel per gross ton; while in a full size 4-hole pit holding 24 ingots (3.3-ton), and operating on a similar heating period, the power chargeable to the wall loss per ton of ingots would not exceed 18 kwhr. per gross ton of ingots put through the pit when ingots were charged at a skin temperature of 1670 deg. Fahr. and heated to 2350 deg. Fahr.

With a higher charging temperature of say 1850 deg. Fahr., which is possible on most steels, the power consumption should not exceed 45 kwhr. per ton; and with ingots charged at 1670 deg. Fahr. and heating to only 2250 deg. Fahr., the power consumption should be under 50 kwhr. per ton. When heating cold ingots in a full size pit, using 6 hr. as the heating time and heating to 2250 deg. Fahr., the capacity of the pit would be 10 tons per hr., and the power consumption 330 kwhr. per ton of ingots heated.

This power consumption makes electric heating prohibitive from a cost standpoint on low-grade steels; but on high priced alloy or high-speed steel, the saving due to the reductions in scale loss may easily compensate for the higher cost of fuel or power for the electric pit. Since by far the largest tonnage of ingots are charged into the pits at temperatures near 1670

*From a paper delivered before the Association of Iron and Steel Electrical Engineers, Pittsburgh, Jan. 30. The author is president of the Baily Furnace Co., Alliance, Ohio.

deg. Fahr., the calculations of power consumption for full size pits may properly be based on steel going into the pit with that temperature.

Scale Loss from Ingots

One of the most interesting features of the test on the electric pit was the determination of metal loss in scale. Both electric ingots and gas-heated ingots were weighed before charging into the pits and after the fourth pass in the mill. The average loss of electric-heated ingots was 0.75 per cent, and on gas ingots substantially 1.75 per cent. The scale loss on electric ingots seemed to be about the same regardless of the time the ingot was in the pit, indicating that this 0.75 per cent loss was caused by the air striking the ingot after stripping and before charging into the pit. In the case of the gas-heated ingots, the scale increased as the time in the pits was increased. While the record of loss on the gas-heated ingots in this case was only 1.75 per cent, it is believed that this figure is too low for average practice, as records taken from a number of other installations of gas-heated pits indicate that a scale loss of 2.75 per cent is more nearly the average loss.

The operation of the electric pit demonstrated conclusively that the bloom coming from the electric-heated ingots had better surfaces in all cases, except perhaps in such cases where the ingots were very scabby. Under such ingot conditions there was no advantage in surface conditions of the blooms by electric heating.

Power Required in Rolling

Due to the fact that the ingots from the electric pit could be and were heated to the desired rolling temperature, and were, perhaps, more evenly heated throughout, the power required for rolling electric ingots was less than for gas ingots heated to the same skin temperature, and it was also noted that the peak load on the mill was less when rolling electric ingots than when rolling ingots heated in the gas pits. It will be noted that in the table the average peak load demand was 9 per cent less for electric ingots than for the gas-heated ingots, and that the number of kilowatt-hours per ton for rolling electric ingots was 25.8 per cent less than for the gas-heated ingots. This can be best accounted for by the assumption that the electric ingots were more evenly and thoroughly heated, which is borne out by the temperature readings

Comparison of Power Required for Rolling Electrically Heated and Gas Heated Ingots. Temperature of the outside of ingots approximately the same by radiation pyrometer

	Temp. at Fourth Pass	Temp. at Ninth Pass	Drop in Temp.	Relative Peak Load	Relative Kwhr.
Electric ingots	2147	2091	56	91	74.2
Gas ingots...	2118	2049	69	100	100

in the table, which shows that there was less drop in temperature of the electric ingots between the fourth and ninth pass.

As there are no regenerators or checker work required for electric pits, they require only about half the space of gas pits of the same capacity. When taking into consideration producer space, only about a third of the space is required as compared with a complete producer-fired installation. Besides this saving in floor space, there is a large saving in foundation cost and the absence of gas mains and stack enable electric pits to be more advantageously located with regard to the pit building and the mill. The savings in foundation, floor space, stack and gas mins is such that the installation cost of an electric pit is less than the cost of a modern producer-fired installation, and about the same as a modern gas pit, fired with coke oven gas.

Summary

The operation of this pit has demonstrated that the quality of heating is uniformly better, due to accurate control of temperature, uniformity of heating, elimination of scale while in the pit, elimination of the cutting of the ingot as in the case of sharp gas flames, and the production of a better surface on the blooms.

The peak power demand on the mills is reduced, as is also the number of kilowatt-hours required for rolling.

There is a saving in space required over gas-fired pits, making is possible to install twice as many pits in a given space, as well as the savings in foundations.

Taking into consideration the saving in scale and the usual cost of steel mill power, the cost of heating is actually less than by any other means, provided the ingots can be charged into the pits at such temperatures as are now common in steel mill practice.

Further than this, it eliminates the discussions between the open-hearth and blooming mill departments as to who caused the trouble in the steel.

The author included in the paper a tabular calculation comparing heating costs per ton of steel for the electric soaking pit and the pit using producer gas or coke oven gas.

With the electric heating, charging ingots at 1670 deg. Fahr. and heating them to 2350 deg., the electrical energy is put at 60 kwhr. At 0.6c. per kwhr., the current cost is 36c. Scale is put at ¾ per cent or 0.0075 ton per ton of steel and valued at $40 per ton amounts to 30c. Renewals and upkeep are estimated at 10c., making a total cost of 76c.

With producer gas heating and the same temperature conditions, 250 lb. of coal are estimated as necessary and at $6 per ton represents 75c. The scale loss is 2¾ per cent, or $1.10. The renewals and upkeep items are 10c. in all the calculations. In this case of producer gas heating the total estimated cost is $1.95.

With ingots charged at 1670 deg. and heated to 2250 deg., the electric cost is calculated to be 62.5c. and that by producer gas heating, $1.125. In these cases, the electrical requirement is put at 50 kwhr., the alternate coal need 167 lb., the loss of scale in the gas furnace 1¾ per cent, and the value of scale, $30 per ton. A cost of coke oven gas fuel is also calculated to be $1.125 for like temperature conditions as to ingots, the gas requirement being 4000 cu. ft. costing 12½c. per 1000.

Expansion of Fabricators Association

New members to the number of 24, all located on the Pacific Coast, stand as an echo of the recent meeting at Del Monte, Cal., of the American Institute of Steel Construction. The names of the members together with others recently added are appended below. The association is notably active, holding numerous group meetings, and Charles F. Abbott, executive director, whose headquarters are at 350 Madison Avenue, New York, is now making a circuit which comprehends meetings at Indianapolis, Chattanooga, Atlanta, New Orleans, Dallas, Boston and Baltimore. In April or May, Lee H. Miller, chief engineer of the institute, Leader Building, Cleveland, will be present at meetings in Los Angeles, San Francisco, Portland and Seattle, with architects, engineers and others interested in the use of structural steel present.

The new members are:

California: Eureka Boiler Works, Eureka; Baker Iron Works, Philip Friedman & Son, Inc., Llewellyn Iron Works, Lowith Iron Works, Modern Iron Works, Inc., Pacific Iron & Steel Co., Union Iron Works of Los Angeles, all of Los Angeles; California Steel Co., Herrick Iron Works, Moore Dry Dock Co., Pacific Coast Engineering Co., all of Oakland; Palm Iron & Bridge Co., Sacramento; Central Iron Works, Dyer Brothers, Golden Gate Iron Works, Judson Mfg. Co., Mortenson Construction Co., Pacific Rolling Mill Co., Ralston Iron Works, Schrader Iron Works, Inc., Western Iron Works, all of San Francisco.

Illinois: A. C. Woods & Co., Rockford.

Oregon: Poole & McGonigle, Portland.

Pennsylvania: Independent Bridge Co., Pittsburgh.

Texas: Austin Brothers and Mosher Steel & Machinery Co.

Washington: Hoflus Steel & Equipment Co., Seattle.

British commodity prices, measured by the London *Economist* index, were 4768 at end of January, compared with 4855 one month earlier. In 1901-5 the average was 2200.

Blast Furnace and Open-Hearth Problems

Mining and Metallurgical Engineers Discuss These at Annual Winter Meeting—Direct Iron Ore Reduction—Manganese Question—New Aluminum Alloys

THE sessions on iron and steel at the annual winter meeting of the American Institute of Mining and Metallurgical Engineers last week, Feb. 16 to 18, at the Engineering Societies Building, New York, while not largely attended, were characterized by the presentation of some excellent papers. Only two sessions were scheduled, one of which was continued into another day. The meetings of the Institute of Metals Division were attended by large and enthusiastic groups.

Two notable lectures were delivered in the week: the annual Henry M. Howe lecture by Dr. John A. Mathews, and the regular Institute of Metals lecture by Dr. Carl Benedicks.

Sessions on Iron and Steel

The majority of the papers at the iron and steel sessions were devoted to blast furnace and open-hearth operations with several others on manganiferous iron ores, direct production of iron ore and one or two on miscellaneous subjects.

The open-hearth and miscellaneous papers were presented at the session Wednesday morning, Feb. 18, and the blast furnace and manganiferous iron ore subjects were discussed at the first session Monday afternoon, Feb. 16. This session was continued into the afternoon of Feb. 18 because of the lack of time to devote to two or three of the papers.

Sulphur in the Basic Open-Hearth

At the morning session, Wednesday, Feb. 18, presided over by Dr. Albert Sauveur, professor of metallurgy, Harvard University, Cambridge, Mass., two papers on open-hearth operations were presented. The first was entitled "Some Factors Affecting the Elimination of Sulphur from the Basic Open-Hearth Process," by C. H. Herty, Jr., research associate school of chemical engineering practice, Massachusetts Institute of Technology, and a group of three associates. The investigation upon which the paper was based was conducted at the Lackawanna plant of the Bethlehem Steel Corporation.

The paper is a detailed report covering the relations in open-hearth reactions between the sulphur in the slag and the sulphur in the bath, and the laws under which the amount in steel can be reduced most effectively. The authors in considering the application of the experimental results to practical operation state that it is necessary to consider two points—how much sulphur may be removed from the bath in the usual time of working a heat by a fuel gas free from sulphur and, second, how the savings obtained by desulphurizing the bath with a clean gas can be offset by the cost of cleaning the gas and by other disadvantages incurred.

In the experiments three types of furnaces were used: A small gas-fired furnace holding about 4 lb., a 100-lb. Booth electric furnace, and a 100-ton stationary open-hearth furnace. The paper is replete with mathematical calculations covering the various phases of the experiments in the three furnaces. Among the conclusions arrived at are the following:

> A direct ratio exists between the concentration of sulphur dioxide over the bath and the amount of sulphur picked up by the scrap during melting.
>
> A direct ratio also exists between the concentration of sulphur dioxide over the bath and the concentration of sulphur in a slag containing lime when sufficient time has been allowed for equilibrium to be established.
>
> The use of a gas free from sulphur will allow a much higher percentage of sulphur in the charge of an open-hearth furnace.
>
> The use of a gas free from sulphur will prevent the loss of time due to high-sulphur heats encountered in present operations.
>
> Sulphur-free gas will be economical under certain conditions as it will allow a higher sulphur and therefore a cheaper pig iron to be used as there will be no time lost on high-sulphur heats.
>
> The economy in using sulphur-free coke oven gas is much greater than in using sulphur-free producer gas on account of the larger volumes of producer gas which must be absorbed.

A. L. Feild, Union Carbide & Carbon Research Laboratories, Long Island City, N. Y., characterized the paper as presenting a new viewpoint. "While men have known that it is possible to eliminate sulphur in the basic open-hearth process, very little attention has been given to the composition of the furnace gas. This

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DR. CARL BENEDICKS

The Annual Lecturers for 1925

TWO prominent metallurgists delivered the lectures which are now a feature of the annual February meeting of the American Institute of Mining and Metallurgical Engineers.

Dr. Carl Benedicks, of Stockholm, Sweden, internationally known for his contributions in various metallurgical fields, delivered the fourth Institute of Metals lecture.

Dr. John A. Mathews, one of America's best known steel metallurgists, was the second Henry M. Howe memorial lecturer.

DR. JOHN A. MATHEWS

paper is an excellent example of how physical and chemical theories can be brought into practice."

Finishing Temperatures of Simple Steels

The second open-hearth paper was entitled "Finishing Melting Temperatures of Simple Ingot Steels," by Henry D. Hibbard, consulting engineer, Plainfield, N. J. The author aims to put into useful form the information at hand regarding temperatures of molten steels covering all carbon contents up to 1.50 per cent in the hope that if the assumed ideal temperatures as tabulated are incorrect, the right ones may be brought to light. He contends that three things largely determine what a batch of steel will really be. Composition, casting temperature, and rate of teeming. Each of these has its advocates as being the most important but they are so interrelated that each must conform to, or be right for, the other two. When one of these is claimed to be the most essential, that one was probably the one which it was found had to be of a certain description to suit the already adopted variations of the other two; that is, it was the last of the three to be brought into line.

For the proper consideration of casting temperatures, the author divides all steels into three classes: Killed steels which settle in freezing and contain no gas-holes; partly killed steels which contain some gas holes more or less harmful and effervescing steels which evolve gas in the molds. Steels of these classes behave differently from each other with variations of casting temperatures. The author then discusses pouring temperatures, killed steel, partly killed steels and effervescing steels. He concludes his paper with a discussion of the effects on steel of variations in casting temperatures.

Discussion

In the discussion of this paper, Haakon Styri, research metallurgist Hess-Bright Mfg. Co., Philadelphia, rather severely criticised some phases, pointing out that in his opinion killed steel was well made steel, partly killed steel was poorly made steel and effervescing steel was "rotten steel." In support of the paper, Mr. Reinhardt, American Rolling Mill Co., Middletown, Ohio, stated that, while it is generally desirable that all ingots should be solid, whether they are or not often depends on what the steel is to be used for. Some makers know that effervescing steel is better than killed steel, if properly finished in the furnace, for the manufacture of certain products. Later Mr. Hibbard called attention to the fact that his paper was a discussion of temperatures and not of quality of steel, acknowledging that most steel made was not killed steel.

One point brought up in the discussion was the efficiency of optical pyrometers. In open-hearth practice these were pointed to as being efficient only up to a certain point and it was acknowledged that, while no steel maker depends upon his eye alone, taking into consideration other things at the same time, it is the experienced melter who really knows the proper temperature at which to finish and teem a heat. The table in the author's paper was pointed to as being valuable and as possibly forming the basis some time for a guide in regular practice.

Several written discussions were announced as having been received, one from Prof. LeChatelier, Paris, France; one by W. J. Priestley, Union Carbide & Carbon Co., Pittsburgh; and one by W. P. Barba, Philadelphia.

Manganese and Iron Sulphide

A very brief paper, also bearing on open-hearth practice, entitled "The Reaction Between Manganese and Iron Sulphide," was contributed by C. H. Herty, Jr., and O. S. True, the latter the author of a master's thesis on the same subject in 1923. Taking as a basis the fact that manganese will desulphurize molten iron through the formation of manganese sulphide, and recognizing the claim that this reaction is generally considered to be reversible, the authors conducted six trials to confirm the results as to the reversibility of the reaction. The results are presented in tabular form, together with photomicrographs, and show that manganese sulphide, even in the presence of an excess of manganese, will be converted to iron sulphide and enter the metal, the reaction therefore being reversible.

The investigation has its value in the role which ferromanganese plays in steel making and the authors show that the greater the excess of manganese, the lower the sulphur in the metal, regardless of whether the sulphur is originally present as MnS or FeS.

Discussion

Declaring that the foregoing paper is an answer to a much discussed problem, A. L. Feild placed upon the blackboard an elaborate discussion of some of his own theories based upon the author's figures to explain some of the data contained in the paper.

Chemical Equilibria in White Iron

In a paper entitled "Chemical Equilibria During Solidification and Cooling of White Cast Iron" by H. A. Schwartz and Mrs. Anna Nicholson Hird, National Malleable & Steel Castings Co., Cleveland, were given results of investigations which constitute a contribution to the knowledge of equilibria in the ternary (metastable) system iron-carbon-silicon. By analyzing cementite, separated electrolytically from white cast iron of known composition and history, the distribution of silicon betwen austenite and cementite during an after-freezing has been followed by the authors. Incidental information also was obtained with respect to the distribution of manganese, silicon and phosphorus, when only relatively small amounts of each are present. The authors' major conclusion is that during solidification equilibrium is attained when the silicon is all rejected to the liquid phase permitting silicon-free austenite to separate.

Metallurgy in Cannon Making

An interesting paper of an historical nature was entitled "Brief History of Metallurgical Progress in Cannon Making with Particular Reference to the Cast Iron Gun" by Job Goostray, R. F. Harrington and M. A. Hosmer, Hunt-Spiller Mfg. Corporation, South Boston, Mass. The paper reviews the subject from the earliest times, outlining three epochs in the history of making cannon and then describing the plants and the work of early American foundries. Foundries and processes from 1840 to 1850 are taken up, particularly what is known as Rodman's process, followed by the discussion of the Dahlgren gun. The earliest 15-in. guns are then discussed. Some of the work turned out by the South Boston Iron Works after the Civil War is also described as well as some of the large guns made at the Fort Pitt foundry in Pittsburgh in the early days. The defence program of the United States in 1885 is touched upon, and the adoption of steel alloys for guns is discussed. Modern high power guns form an interesting part of the authors' paper, together with some remarks on German long-range cannon.

The authors conclude with a statement that in warfare as in peaceable times one improvement follows another and perfection is seldom reached. The final improvement of today is a stepping-stone to the new one of tomorrow. This is well; for such men as are willing to devote themselves to science and research must have fields sufficiently large to repay them for their studies. The most difficult tasks become easy when progress is shown, however slight this progress may be. The authors express the hope that this paper has brought out the progress of the past, some of the facts and problems connected with it and the possibilities of scientific study in the future.

Sulphur in the Blast Furnace

An important contribution to the technology of the blast furnace was one of two blast furnace papers presented at the first steel session, Monday, Feb. 16, at which Ralph H. Sweetser, assistant to vice-president American Rolling Mill Co., Columbus, Ohio, was chairman. It was entitled "Effect of Sulphur on the Blast Furnace Process" and was presented in abstract by

(*Continued on page* 663)

Investigation of Industries Goes to Extremes

Senator Fess Discusses Growth of Large Companies Under Anti-Trust Act and Increasing Stock Ownership by Employees

WASHINGTON, Feb. 20.—The craze of Congress to investigate so-called big business is looked upon as having gone the limit when the Senate last week adopted the resolution of Senator Norris, of Nebraska, which calls upon the Federal Trade Commission to investigate and make a report concerning the General Electric Co. The investigation shows that Senator Norris has been seized with the idea that the company is a monopoly.

The resolution calls for a report as to the extent the company or stockholders or other security holders, either direct or through subsidiary companies, etc., "monopolize or control the production, generation or transmission of electric energy or power, whether produced by gas, steam or water power." Statements have come from responsible sources that, while the investigation will submit the General Electric Co. to the usual annoyance and expense that business is put to when inquiries of this sort are conducted, the report itself will inevitably reveal such a clear bill of health for the company that the Senate may regret its hasty action. To this end, at least, investigation would possess merit in the way of providing a rebuke to Congress for its passion to investigate big business enterprises even though, as in the present case, there is every reason to believe that they are conducted honorably in every respect and performing a vast service for the country.

Speaking on the resolution, Senator Fess, Republican, of Ohio, traced anti-trust legislation that has grown out of agitation concerning the growth of so-called monopolies and declared that the growth of corporations under the anti-trust law had been tremendous. For example, he pointed out, in 1919, the individual or independent manufacturers, numbering about 140,000, and employing 600,000 laborers, produced less than $4,000,000,000 worth of commodities, while 90,000 corporations produced $55,000,000,000, and employed 8,000,000 workers. In other words, it was pointed out, about half of the number of corporations employed 13 times as many laborers and produced 14 times as much in commodities as the individual or independent producers.

Senator Fess said he mentioned this to indicate the trend since 1890, the time of the anti-trust legislation in modern industrialism. Today, he explained, it is safe to say that not over 10 per cent of the entire production in America is by individuals or independent concerns, which would mean that 90 per cent of all the production of the wealth of the country today is by organizations known as corporations or partnerships.

Senator Fess recalled the agitation which led to drastic regulation of business because of the widespread fear that the growth of monopoly was so rapid that ultimately the rights of the people would be entirely denied. He referred to the fear that was expressed about the organizations of the United States Steel Corporation, the Standard Oil Co., and the agitation that was excited against these organizations. The Senator said that a change of policy has come coincidently with the seeking of a remedy to prevent the dangers that seemed to be apparent. He declared that it is his opinion that it is very noticeable today that while concentration is the law of the hour, regulation or control by the Government is absolutely demanded. He stated that there is a change of public sentiment in the general attitude toward the entire question and that there is a clearer understanding today in the minds of the general public of what great business or big business is. He said that he thought that other senators would agree that merely because a thing is big it is not necessarily vicious. On the other hand, he pointed out that he could see the advantage of the large dimension of business provided it does not take advantage of the public which it serves.

Another fact that is indisputable, he said, is that whether big business willingly accepts it or not, the large businesses are accepting the principle of Government regulation. His only concern, he said, in the control of these industries is that regulation shall not go to the point of strangulation.

"That is the danger invariably," said Senator Fess, "and yet with the Government in control it is not likely that a business, unless it is purely through prejudice, will suffer by Government regulation. That element of prejudice is ever to be avoided and is a danger in such legislation as here proposed."

Senator Fess referred to the tremendous movement

Senator Bruce States His Position

THE mania for investigations that flourishes in Congress with increasing virulence has not gained control of all of the members of that body. Indeed, Senator Bruce, Democrat, of Maryland, has set up a code which would prove a most effective antidote if it were applied generally. He announced his attitude toward these investigations as follows in connection with a resolution offered by Senator Trammell, Democrat, of Florida, to inquire into the reason for increases in gasoline prices:

"I confess that I, for one, am beginning to be just a little restive in relation to these proposed investigations which have been coming along with increasing frequency, it seems to me, in the closing stages of the present session.

"I do not know of an easier way to acquire the reputation of being a tribune of the people than to offer a resolution of this sort. In my judgment, in every sense it is the cheapest way I know to acquire that reputation. On the other hand, but for the popular disrepute into which these suggested investigations have fallen, and which render them more or less innocuous, they would serve practically no purpose except that of harassing the great business interests of the country.

"So far as I am concerned, I propose to lay down for myself a law of almost unvarying uniformity in cases of this kind, and to adhere to it except where some conditions of a distinctly special and extraordinary nature are brought to my attention; that is to say, I shall insist that every proposition of this kind shall be referred to a committee, and be deliberately and duly weighed by that committee, and that before any sort of serious heed shall be given to it by this body, testimony—substantial, material testimony—shall be presented to that committee, making out a prima facie case justifying the investigation."

during the last 20 years toward democratization of industry through stock ownership. He had reference to the ownership by the public through the purchase of stocks of the companies that are doing business. Among others, he referred to the fact that in 1902, there were 43,000 stockholders of the United States Steel Corporation, including 27,379 employees of that organization, while in 1924, there were 159,000 stockholders, including 50,020 employees. The Bethlehem Steel Corporation, Senator Fess said, has about 50,000 stockholders, with 14,000 applicants among its employees under the new purchase plan that has just been announced. He detailed many other figures showing stockholding by employees of industries and railroads.

Ford Motor Co. Will Do All Its Own Manufacturing

So Testifies a Witness in Bethlehem Merger Hearing—Effects of Mergers Discussed

PHILADELPHIA, Feb. 24.—Prices on the same product at the same time quoted by different makers are as a general rule "very, very close," President Charles G. Davis of the Pennsylvania Forge Co., Philadelphia, told Attorney B. B. Bane of the Federal Trade Commission at the Bethlehem merger hearings here. The company, Mr. Davis said, makes hammered and pressed open die forgings, and buys forging and rerolling billets and also alloy ingots, and makes purchases since the merger from the same sources as before it took place, except that those first made from the Midvale Steel & Ordnance Co. and the Cambria Steel Co. are now made from the Bethlehem Steel Corporation and include billets. Mr. Davis said that there are variations in prices in competitive times.

"Would you say, Mr. Davis, that prices were more stable and uniform among the companies on the same product at the same time or less stable and less uniform prior to the war than they have been since the war?" inquired Mr. Bane.

"I think, if anything, a little more stable," the witness replied, referring to the period prior to the war.

Asked whether a buyer is better off with a few or more sources of supply, Mr. Davis said it was his opinion that he is better off with more. He said his company operated its own 15-ton acid open-hearth furnace and rolling mill from 1919 to 1923 but dismantled the plant because it was not a commercial success. Mr. Davis said he thought the plant was too small and made high overhead and conversion costs.

Evidently striking out on a more definite line as it affects the case at issue, Attorney Bane asked the witness whether mergers tend to stabilize prices, and after objection by Attorney Wood for the Bethlehem Steel Corporation, Examiner McCorkle permitted Mr. Davis to make a reply based on his own experience and opinion. Mr. Davis said that it has been his observation that mergers do have the tendency indicated.

Harry L. McClure, purchasing agent for the Lancaster Steel Products Corporation, owned by the General Motors Corporation, at Lancaster, Pa., maker of cold-rolled and cold-drawn steel, said that he purchases hot-rolled products, including carbon bars, alloy bars, wire and strips, his purchases amounting to about 18,000 tons a year. He said that prior to the Bethlehem merger hot carbon bars were purchased principally from the Carnegie Steel Co., but since then are bought from that company, the Bethlehem Steel Co. and the Republic Iron and Steel Co. Purchases of alloy bars were stated to amount to about 9000 tons a year and were made both before and since the merger from different sources, including the Bethlehem company. The larger part of wire rod tonnage is bought from Bethlehem. The amount of this product bought in a year was estimated at about 1200 tons.

Miss Gertrude L. Campbell, purchasing agent for the D. Willcox Mfg. Co., Mechanicsville, Pa., maker of drop forgings, said that her company makes this product chiefly for the Ford Motor Co., Detroit., which purchases the steel and has it shipped prepaid from the steel plants to the Wilcox company. Purchases of the steel, carbon and alloy bars, Miss Campbell said, amount to about 2000 tons a year, of which about 1500 tons is carbon bars. Prior to the merger, she said, the larger part of the carbon bars was purchased from the Carnegie Steel Co., with the Cambria Steel Co. coming next. Since the merger, she stated, most of the tonnage is bought from Bethlehem with Carnegie coming next. Alloy steel bars, both before and since the merger, it was stated, have come from the United Alloy Steel Corporation and the Central Iron & Steel Co., and have been used to make ring gears and differential spiders for the Ford Motor Co., for the past 14 or 15 years, Miss Campbell said.

"Do you know whether or not you are going to continue to do that kind of work for Ford?" Mr. Bane inquired.

"To the best of my knowledge we are not," she replied.

"Why?"

"Ford is going eventually to do all his own manufacturing and eliminate all his outside sources of supply."

Miss Campbell said that her company proposes to continue in the forging business.

Iron and steel purchased by him are practically all sold on a Pittsburgh basis, or the equivalent of the Pittsburgh price plus freight to his plant, Jesse L. V. Smith, president and manager of the Potts Mfg. Co., Mechanicsville, Pa., said. The company makes iron fences, stairways, ornamental iron, cellar doors and fire escapes and fabricates light structural shapes, and purchases shapes, plates, bar iron and steel castings. Purchases of shapes, amounting to approximately 1000 tons a year, and of from 350 to 400 tons of bar iron, constitute the greatest buying, the witness said. Both are bought from the Bethlehem Steel Corporation along with other sources. Before the merger by Bethlehem bar iron had been bought from the American Iron & Steel Co., and still is. Shapes also had been bought from Bethlehem before it took over properties of the Midvale Steel & Ordnance Co. and the Lackawanna Steel Co. He said that when the market is running along steadily there is practically no variation in prices quoted on the same product at the same time, but "when the market is changing, why, you will get a variation as much as 10c on the hundred." Mr. Bane asked the witness if he was familiar with the prices suggested by the so-called Redfield committee in 1919. Mr. Smith said he thought the United States Steel Corporation adopted and kept the prices throughout. He claimed the Steel Corporation did so because it had to.

"They had their books so filled that they had nothing else to do," he declared.

Walter W. Posey, president and manager of the Lancaster Iron Works, with plants at Lancaster, Pa., and New London, Ohio, plate fabricator and manufacturer of brick and clay machinery, said that before the merger he purchased most of his plates from Midvale, but that there were then as now several sources of purchases. Mr. Posey said that the market was much more stable before than since the war. He said his plate purchases amount to about 12,000 tons a year.

William DeCou, Jr., vice-president of the Richard DeCou Co., Philadelphia, steel jobber and fabricator, said he purchases about 8000 tons of steel annually from Bethlehem and other sources and had bought from some of the companies acquired by Bethlehem before the merger. He declared that the market is very competitive in dull times.

Motor-in-the-Base Milling Machines

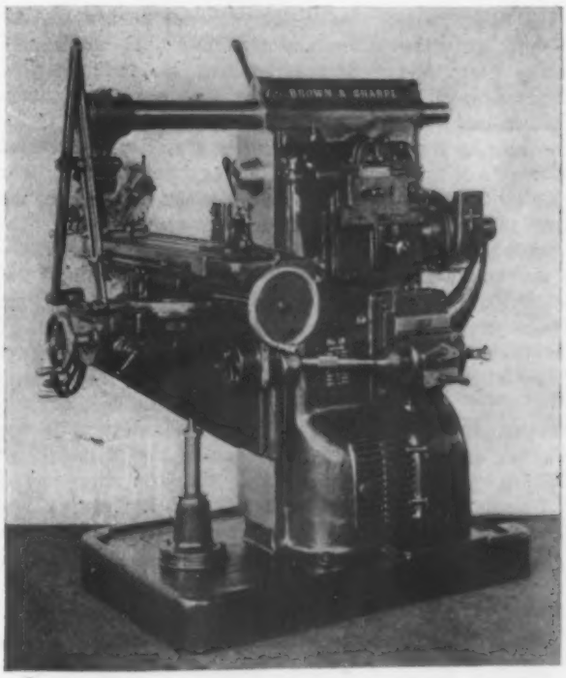
Motor-in-the-base type of milling machines have been added to the line of the Brown & Sharpe Mfg. Co., Providence. The new machines are adaptable either to belt or motor drive, and when equipped with motors, are entirely self-contained.

The machines are available in two styles of three sizes each, the Nos. 1A, 2A and 3A universal, and the Nos. 1B, 2B and 3B plain milling machines. Except for the construction necessary for the motor-in-the-base style of drive, the machines do not differ materially from the company's standard column and knee type tools. The column and base is a one-piece casting with thick walls, internally braced, and the base is of large area. Convenient location of speed and feed mechanisms and operating levers is a feature as heretofore.

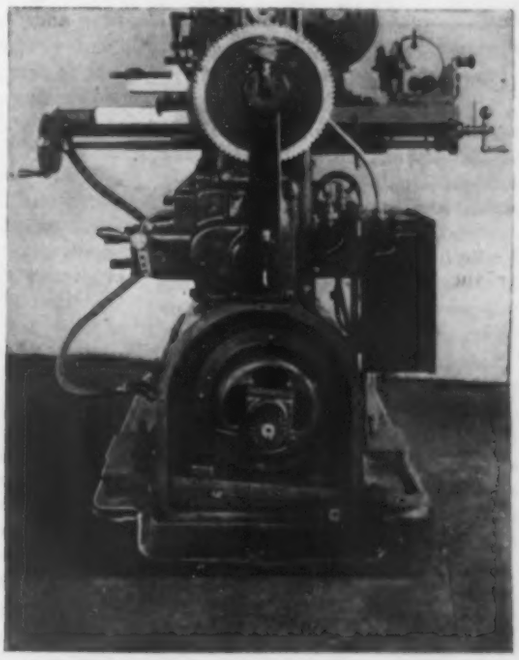
The principal change is the redesign of the lower part of the column to provide for the motor compartment which is cast with a solid top as a part of the column. Protection is furnished the motor from oil, cutting lubricant, chips and dirt. A tank for the cutting lubricant is also located in the base, extending around the foot of the elevating screw. Strainers in the top of the base provide for the prompt return of all oil to the reservoir. Circulation of air is obtained by means of three ventilators located on the sides and rear of the motor compartment, these ventilators serving also as a means of ready access to the motor for purposes of lubrication, repairs, adjustment and cleaning. Oil wells fastened to the frame of the motor, and easily accessible through the door on the right of the machine, are connected by tubes to the motor bearings. This provides quick and positive means of lubricating these parts.

The motor is mounted on a separate adjustable base, which arrangement is intended to facilitate installing and removing the motor and to provide for adjustment of the driving chain. This base is hinged on the right side and its angular adjustment is regulated by means of the bolt on the left of the column outside the compartment. The bed of the motor is tongued and slides into a groove in the hinged base. When in position, the motor is held firmly in place by a gib inserted in the motor ways, as shown in the illustration.

The ease with which the friction driving clutch can be adjusted is a feature stressed. This clutch is mounted within the driving pulley or sprocket on the main drive shaft. By removing the small plate on the side of the pulley, through an opening in the chain guard, the clutch may be readily adjusted without any further dismantling of the machine. Access to the motor compartment is obtained by removing the chain guard, chain and rear wall of the compartment. When used as a belt-driven machine the motor compartment is available for storage of tools and parts. The change from belt to motor drive may be made conveniently.



The Principal Change Is the Redesign of the Lower Part of the Column. The motor-in-the-base machines are adaptable to either motor or belt drive, the latter being shown above



Rear View of Motor-in-the-Base Milling Machine with Chain and Guard Removed. The motor base is hinged and is arranged for convenient angular adjustment

Bookings of Commercial Steel Castings

January bookings of steel castings reported by the Department of Commerce show 82,922 net tons, or 82.6 per cent of capacity. Except for December, with 96,164 tons, and March, with 100,514 tons, the current figure is higher than for any month of 1924. It includes railroad specialties amounting to 40,799 tons, or 94.9 per cent of capacity, and miscellaneous castings amounting to 42,123 tons, or 73.4 per cent of capacity. In both railroad specialties and miscellaneous castings January fell below December. With the further exception of February and March, however, the railroad specialty total was the highest of the past 16 months, while, except for December, the miscellaneous castings showed a higher tonnage than at any time in 16 months.

British coal production in 1924 amounted to about 270,000,000 gross tons, against 278,500,000 tons in 1923. Exports accounted for 62,200,000 tons against 78,500,000 in the previous year. Domestic consumption and storage increased to 186,000,000 tons in 1924 from 176,000,000 tons in 1923.

Iron and steel exports from Sweden to the United States in January were valued at $346,200, as against $327,511 in December, while the value of iron ore shipments received from that country in January was $37,000, compared with $78,315 in December, according to a cablegram received by the Department of Commerce.

FEBRUARY INDICATIONS OF THE BUSINESS TREND

Inflation seems to be making litle headway.
The advance in the general level of commodity prices has been checked.
Growing irregularity in business is likely to develop.
The physical volume of trade and dollar sales appears to be nearing a peak.
The most sensitive steel barometers forecast a setback.
The general level of consumer purchasing power does not seem likely to reach, in the near future, the peaks attained in 1923 and 1924, but is sufficient to support a good level of business activity.

BY DR. LEWIS H. HANEY AND WALTER G. BERNTHAL
New York University Bureau of Business Research

The Business Situation

THE struggle continuing between (1) the inflationary forces which are tending to promote speculation and (2) the condition of uncertainty, based on the existence of high-capacity, high costs and moderate purchasing power, is tending to hold optimism in check. Last month it was stated in these pages that inflationary developments did not seem likely to go much further. This month that opinion is strengthened. It is true that the expansion of bank credit among the member banks of the Federal Reserve System continues and speculation in stocks and commodities has shown some wildness. But certainly the situation is far from getting out of control.

Undue inflation tends to be prevented by the continued expansion of production, which has been sufficient to allay any fears of shortage and to check most pyramiding and speculative buying. The advance in commodity prices, too, has in the last two or three weeks ceased, with a weaker trend in some of the basic products. The recent short but very sharp setbacks in the grain and stock markets have given warning. Gold exports continue in large volume and these serve also to warn of the time when they will have continued long enough to cause a substantial reduction in our gold reserves. The last Treasury report indicates that the per capita circulation of money on Feb. 1 had fallen to an average of $41.86, compared with over $44 on Jan. 1 —a fact which does not suggest inflation.

Above all, however, there is still lacking any great spirit of buoyancy or optimism in trade and the highly colored forecasts made at the opening of the year are beginning to seem a little overdrawn. The volume of retail trade has been rather large, but in December it was only a little greater than at the peak in 1923, and wholesale trade on the whole has not made much progress of late. The rate of gain in bank debits has fallen off considerably, when allowance is made for seasonal variation. Altogether, the most that can be said is that business is fairly good on the average, with not a few exceptions.

A peculiar situation is revealed by the January price data. The Bradstreet's index showed a decline of 0.3 per cent, while all the other indexes were up somewhat—Dun's up 1 per cent, Bureau of Labor Statistics up 1.8 per cent, the Fisher index up 3.4 per cent. To some extent these differences are due to the fact that the Fisher and Labor Bureau indexes are averages for the month, while the others are as of the first day of the month. Dun's index seems to be more affected by grains and Bradstreet's more by cotton. It is probable that the strong upswing which began last summer has been decidedly checked. The number of commodities showing price declines recently has exceeded those showing advances and it would not be

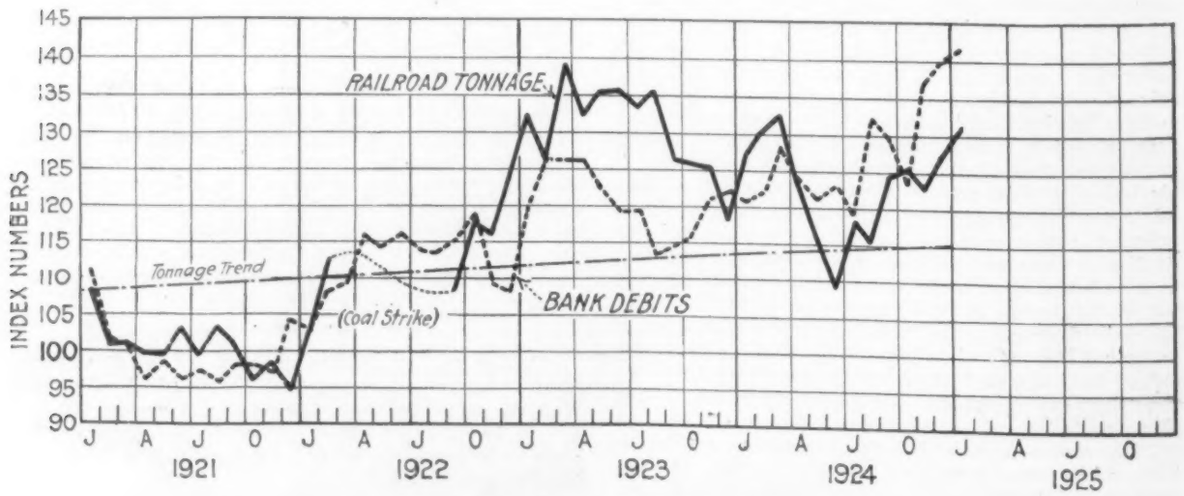


Fig. 1.—The Business Cycle: Railroad Traffic and Bank Debits

The railroad tonnage curve is based on the car loadings and tons per car of Class 1 railroads and is adjusted for seasonal variation. The trend line shows the rate of the average monthly growth during the last ten years. The bank debits curve is the monthly average of total bank debits adjustable for seasonal variation. The curves are based on index numbers, with the monthly average for 1921 as 100

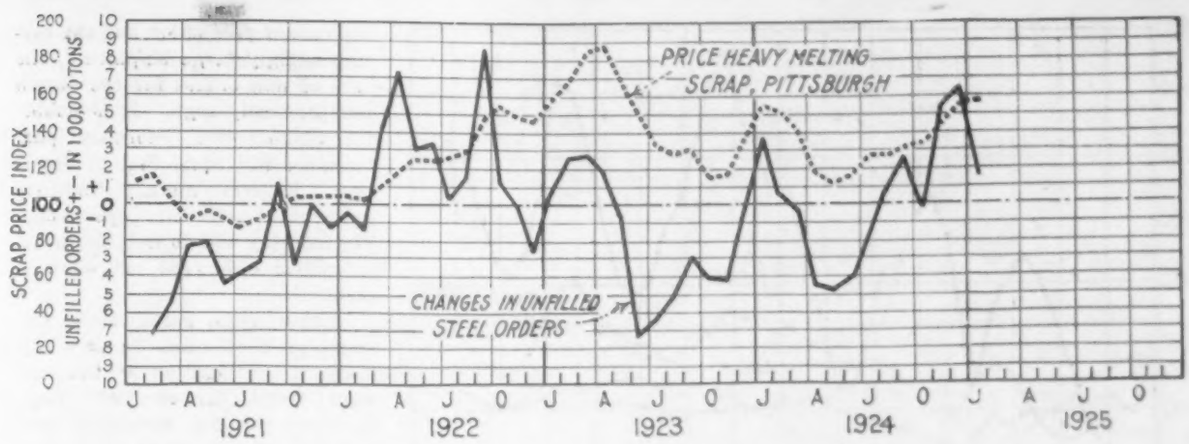

SCRAP PRICE INDEX
UNFILLED ORDERS + – IN 100,000 TONS
PRICE HEAVY MELTING SCRAP, PITTSBURGH
CHANGES IN UNFILLED STEEL ORDERS
J A J O J A J O J A J O J A J O J A J O
1921
1922
1923
1924
1925

Fig. 2.—Steel Barometers: Unfilled Orders and Scrap Price

The unfilled orders curve represents changes in unfilled orders, allowing for seasonal variation. A rise in the curve may indicate either a smaller decrease or a larger increase than occurred in the preceding month. The scrap price is that of heavy melting steel scrap at Pittsburgh, as reported in THE IRON AGE

surprising to find a general decline registered by the indexes next month.

In general, price averages tend to move in the opposite direction to an index of stocks of commodities on hand, and to move in the same direction as an index of unfilled orders. Production tends to follow the course of price indexes and, if it lags behind the movement of prices, the subquent rise in price is generally greater. At present the Department of Commerce index of stocks of 45 commodities, after an advance in December, stands at a high level; unfilled orders in the industries for which this information is available have increased, but are relatively small; the index of production is well up with that of prices. *Accordingly, aside from the possibility of inflationary developments, there is not much outlook for further advances in the price levels in the near future.*

The Business Cycle

THE railroad tonnage and bank debits curves, which appear in Fig. 1, are the leading indexes of general business conditions. These indexes are beginning to show evidence of a halt in the business upswing. The curve of railroad tonnage, which is an index of the physical volume of trade, has shown an upward trend since June, 1924. This index, after a severe decline during the spring and early summer, has recovered to a point almost up to the peak established last March, and is now not far below the 1923 peak. The February weekly figures indicate that the movement of freight is still at a high rate and that goods will continue to move in large volume for at least another month.

A peak seems near at hand, however, and a downward turn may reasonably be anticipated thereafter.

Bank debits, which are the best index of total dollar sales, showed no such sharp decline in the Spring and Summer of 1924 as did railroad tonnage. Consequently the recovery started at a relatively high point and, in the last six months, bank debits have reached a position far above any previous peak. Rising commodity prices and the unusually large demand for funds for speculative purposes have been largely responsible for this condition.

The January increase, however, was relatively small and the curve seems to indicate that the upward swing has been checked. Recent indications of price softness undoubtedly will have a restraining influence upon bank debits. An immediate break is not expected, however, but rather a short period of stability, which may be followed by a decline.

The facts suggest that the out-

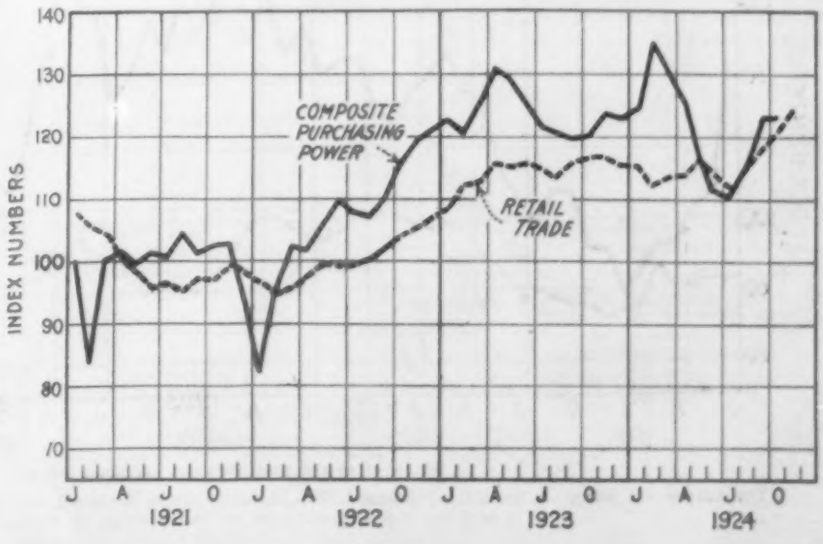


Fig. 3.—Trend of Purchasing Power

The purchasing power curve is a composite for 14 branches of agriculture, 18 important manufacturing industries, all laborers and the railroads. Both curves represent three-month moving averages

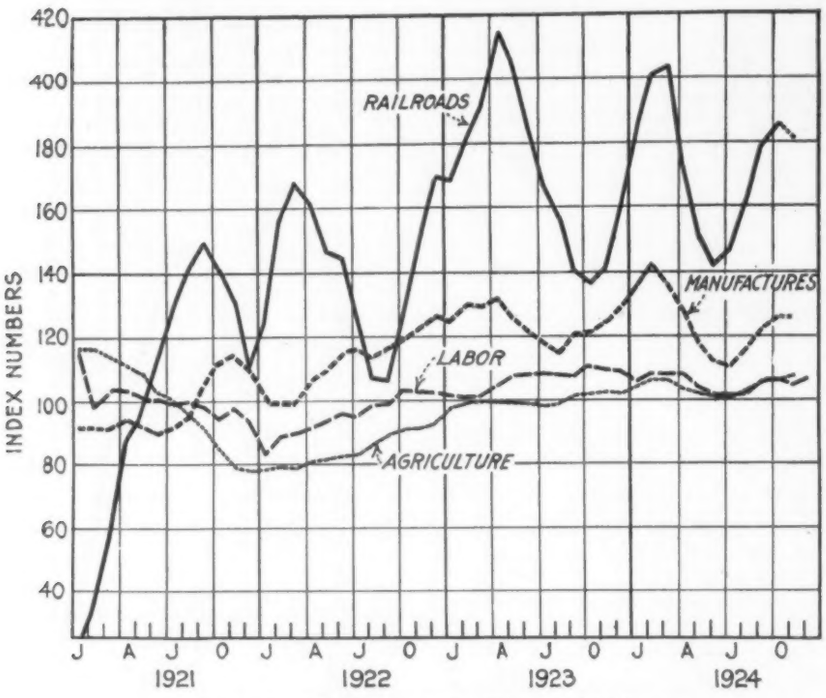


Fig. 4.—Trend of Earnings in the Chief Industrial Groups

The curves represent three-month averages, excepting the labor curve. November railroad and manufacturing indexes are estimates. Agriculture and railroads are adjusted for seasonal variation

look for business up to the end of the quarter is good, but that it does not seem advisable to make plans on the assumption of continued expansion during the second and third quarters.

Steel Barometer: Unfilled Orders and Scrap

Figure 2 includes an index of the price of steel scrap and another showing *changes* in the unfilled orders of the United States Steel Corporation. The latter is corrected to eliminate purely seasonal changes. These curves are barometric of conditions in the iron and steel industry and are valuable as forecasters of general business, since the iron and steel industry generally anticipates changes in the general business situation.

Unfilled orders gained again in January, but the increase was only about 25 per cent as great as that of the previous month. Nevertheless, considering the record January rate of production and the correspondingly large shipments, the total of new orders for the month was unusually high. It is doubtful whether the February performance will equal that of January. Reports already indicate somewhat curtailed operations. The industry will do well, however, if unfilled orders do not show a decline.

Although the index of the average price of scrap in January shows a continuation of the upward trend started last May, there was actually, during the second half of the month, a decline which has now been in progress for six successive weeks. Reports indicate that the market is very inactive and is characterized by lack of consumer interest.

The price decline has been slow and regular, with no tendency to sharp breaks. This confirms our belief that general business will continue favorable for at least a month or two. After this period there will probably be a gradual slowing up of activity.

We suggest that readers watch closely for developments in the scrap market, as it will have a significant bearing on the future of the industry.

General Trend of Consumer Purchasing Power

IN Fig. 3 are two curves of great general importance. The upper curve indicates the trend of the

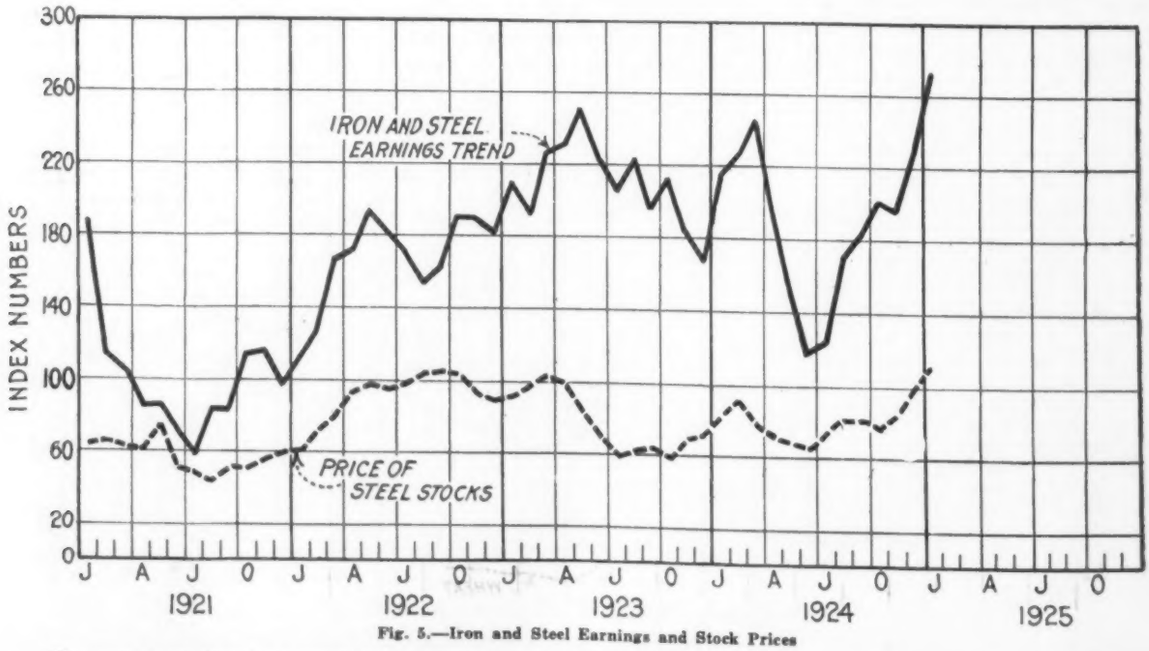


Fig. 5.—Iron and Steel Earnings and Stock Prices

The curves are based on monthly averages. The earnings index is based on 1921 as 100, and the index of nine steel stocks is based on the average of 1917-1921

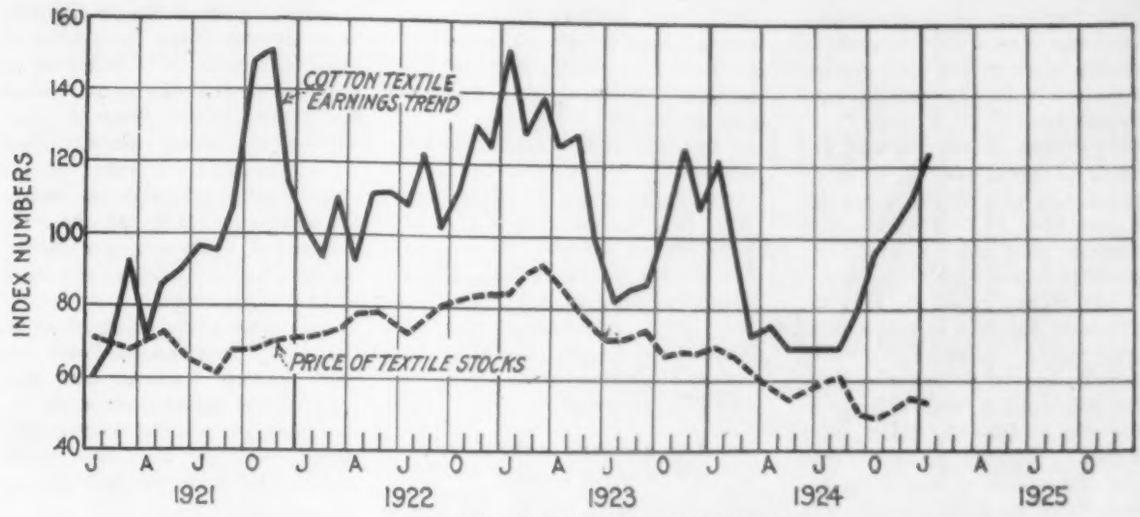


Fig. 6.—Cotton Textile Earnings and Stock Prices
Monthly average earnings based on 1921 as 100. Stock prices based on 1917-1921

total earnings of the country, after making allowance for changes in the cost of living. It is based on returns from representative groups of manufacturing industries, branches of agriculture, the railroads and labor. It represents roughly the formula: Income less cost of living.

The second curve shows the trend of retail trade based on weighted averages for various groups of retail stores throughout the country.

It is apparent that *at the end of* 1924 *the purchasing power of the chief classes of the nation's population had come back to the general level of the last two years, and was considerably above the levels of* 1921 *and* 1922. At the end (the last point represents an average of September, October and November indexes), there was a pause in the gain in purchasing power which makes it doubtful whether the curve will continue to rise to the peaks reached in 1923 and again in 1924.

The curve of retail trade has gained rather consistently ever since 1921, and shows a particularly sharp rise in the second half of 1924. It is evident that the general trend of retail trade is influenced by purchasing power. At the end, the retail trade curve shows indications of rising to the level of the purchasing power curve, and *it is suggested that within a few months further expansion in retail sales may be checked by the limits of purchasing power.*

Favorable and Unfavorable Factors in Business

AMONG the more fundamental favorable indications this month are the following:

(1) Smaller indications of speculative inflation.

(2) Profit margins in a number of manufacturing industries promise to be fairly good. The outlook in several industries, some of which have been backward, suggests that improvement will help support industry in general for some time to come. Among those to be especially mentioned are: railroads, petroleum, rubber and tires, leather and shoes, tobacco.

(3) Retail trade is at a high level and, since it compares favorably with wholesale trade, there is no evidence of overbuying by retailers.

(4) Unfilled orders showed further gains in January.

(5) The number of business failures, although probably abnormally great, show a decrease when corrected for seasonal variation.

(6) Money is "easy" in every sense of the word, and the reserve ratio in January showed an increase.

UNFAVORABLE factors in business as they appear at the middle of February may be summed up as follows:

(1) The volume of production has increased too rapidly, calling for downward readjustments in coal, steel, etc. The Federal Reserve Board's index of production in basic industries is nearly as high as at last February's peak.

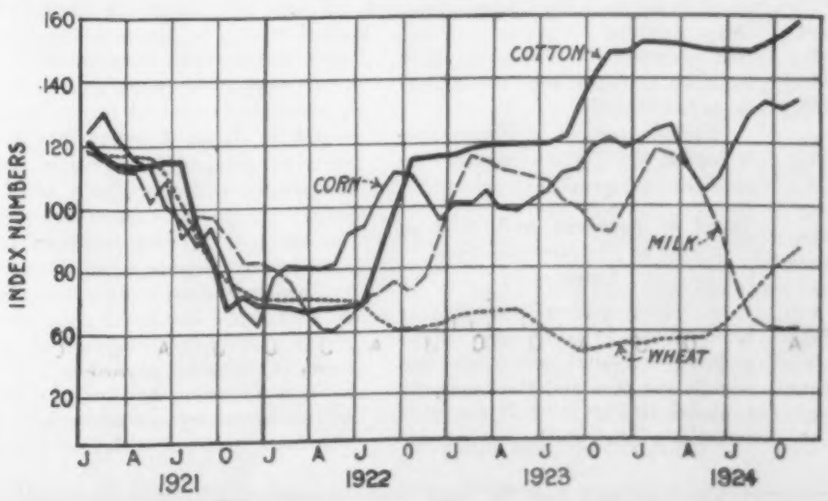


Fig. 7.—Earnings Trends in Agriculture
The curves represent the trend of the monthly total farm sales of four important products. Seasonal variation is eliminated. The 1921 average is 100

(2) The uptrend in commodity prices has ceased and it appears probable that prices can not be maintained with the present rate of production.

(3) Stocks of commodities, according to latest advices, have increased and this is borne out by the fact that production in basic industries has gone ahead more rapidly than railroad shipments.

(4) Money rates are firming. In January the rate on commercial paper failed to show the usual seasonal ease, with the result that, after eliminating seasonal variation, the adjusted index rose sharply. Rumors have it that about the middle of March the interest rates may tighten up considerably.

(5) The average weekly earnings of labor in January generally declined. The United States average was down 3.5 per cent, and declines were registered in the industries of Illinois, Massachusetts, Pennsylvania and New Jersey. In New York, however, there was a small gain. This decline in earnings is only partly seasonal. To some extent wages have been reduced, but the most plausible explanation for the general decline appears to be a small reduction in full-time operation.

(6) The most sensitive barometers of iron and steel (see Fig. 2) declined.

(7) New business enterprises fell off in January, and the trend of an adjusted index of new enterprises indicates less confidence in the future.

A SUMMARY of the foregoing lists of favorable and unfavorable conditions suggests that *the question of the industrial future is still a two-sided one. At present, however, the balance does not seem to be so favorable to optimistic conclusions as was the case a month ago. Undoubtedly the trend is still upward and should continue so throughout the spring; but no boom is in sight and an irregular condition is likely to continue in the near future.* The outlook seems to be that business will settle to a rather steady volume, with moderate earnings, and continue so for four or five months. While it is, of course, purely an hypothesis at this time, it seems that at least a moderate recession may occur by about June.

The general situation may be summed up by saying that production on the whole has nearly reached a critical point. If consumption and demand will take care of the growing volume of output and support further price gains, a higher peak will naturally be reached; but present indications cast doubt on such a development.

The *P-V* line (ratio between commodity, prices and volume of commodities, page 33, THE IRON AGE, Jan. 1), which, it will be remembered, is the main forecasting device back of this service, turned downward in January. This line has given remarkably accurate forecasts in the past, and while the January decline was small, it sounds a warning.

Trend of Earnings in the Chief Industrial Groups

In Fig. 4 are shown the component parts of the composite purchasing power curve. The general trend of the four curves during the period covered has been upward, but the rate of increase is less toward the end. Especially are the gains in earnings of the railroads, manufacturing industries and labor tapering off. The income of agricultural classes is still on the up-grade. Considering the four years as a whole, the railroads have shown the greatest comeback, with agriculture second.

Evidently the spread between manufacturers' income and the income of laborers has widened a little at the end, which suggests a more favorable outlook for profits in industry. At the same time, the spread between agriculture and manufacturers is narrower than at most points throughout 1922-1924, indicating a better balance.

In each of the four groups shown in Fig. 4 the trend of the earnings is now below the peaks of 1923 and 1924, except in the case of agriculture. The present levels, however, are above those in the same months of either 1922 or 1924, except in the case of labor, and the earnings of labor are about the same. According to the latest bulletin of the United States Department of Labor, employment and payrolls in January, 1925, were about 5 per cent lower than in January, 1924.

The earnings of all classes may *be called satisfactory, but are by no means of boom proportions.*

Trend of Earnings and Security Prices in the Iron and Steel Industry

A close general relationship between the price of steel stocks and the indicated trend of earnings in the iron and steel industry is shown in Fig. 5. It is true that sometimes the stock market anticipates the trend of earnings and at other times the two coincide, but the correlation is sufficient to demonstrate that the stock market has served recently as a good barometer. Since the earnings' trend here shown is based on the estimated monthly margin, and is available in advance of the publication of earnings statements, the forecasting ability of the stock market is apparent.

In January the trend of earnings in the iron and steel industry was notably upward and had reached the highest point in the last four years. The average for nine steel stocks, as shown in the graph, also was moving upward sharply.

Trend of Earnings and Security Prices in the Cotton Textile Industry

In the cotton textile industry, as in the steel industry, a fairly close relationship between the price of stocks and the trend of earnings is apparent, but there are two difficulties in making the comparison. In the first place, there is a strong seasonal movement in earnings which sends them up at the end of each year. In the second place, the list of stocks includes those of woolen producers and others not strictly connected with the manufacture of cotton cloth.

In general, the earnings curve anticipates the trend of stocks in this case. The trend of cotton textile earnings was sharply upward at the end of the period and in January, 1925, had reached about the same level as in December, 1922 and 1923, and was above January, 1924. In view of this fact, the average of the stock prices shown appears to be unduly low.

Divergent Trends of Earnings in Various Agricultural Lines

A glance at Fig. 7 shows that the loose talk about the improved position of the farmers requires some modification. This would be even more clear were it feasible to show similar curves for all farm products. While it is true that the farmers' receipts from cotton are large, the milk curve tells a different story. This explains why the curve of agriculture shown in Fig. 4 is not more sharply upward in its course than would ordinarily be supposed. In all the data concerning agriculture allowance is made for seasonal conditions.

It is apparent that during each of the last two years cotton growers have received a larger total

In This Issue

Steel consumers in four States take half the output.—Analysis of steel consumption by States will help in planning sales. Aggregate requirements of 25 States are less than 4 per cent. Pennsylvania the greatest consumer as well as producer.—Page 610.

Foundry open hearth furnace roof in use a year without requiring repairs.—Accurately made brick said to be chiefly accountable for unusual durability.—Page 613.

New aluminum alloys combine strength and workability.—"Artificial aging" (low temperature heat-treating) is important factor in imparting hardness to new alloys with strength of mild steel and improved working qualities.—Page 666.

Satisfactory business in steel castings.—January bookings by steel casting manufacturers reporting to Washington totaled 82,922 tons, 82.6 per cent of capacity. Although lower than December, this total is higher than for any other month of 1924.—Page 623.

Very thick side walls in malleable air furnaces save fuel at the expense of refractories.—Best economy in both fuel and brick is obtained with 12-in. walls. Very thick walls to insure heat insulation result in rapid destruction of inner linings, says speaker at Ceramic Society's annual meeting.—Page 612.

Freight traffic continues heavy.—With 928,244 carloadings for week ended Feb. 7, first six weeks of the year set a new record for the period, 5,379,237 cars.—Page 670.

Senator says immigration problem is solved.—Senator Reed says question is settled for the first time in 75 years.—Page 614.

Less sulphur in the gas permits of more sulphur in the charge.—In basic open hearth process, sulphur-free gas allows higher sulphur content in the charge. Coke oven gas preferable to producer gas.—Page 619.

Ford to eliminate outside sources of supply.—Witness testifies to receipt of notification from Ford Motor Co. that it will eventually manufacture all its requirements.—Page 622.

Forecast good business throughout first quarter.—"The facts suggest that the outlook for business up to the end of the quarter is good, but that it does not seem advisable to make plans on the assumption of continued expansion during the second and third quarters," say business analysts.—Page 626.

Tank, stack and boiler business.—Steel plate fabricators reporting to the Government did three-fourths as much business in 1924 as in 1923. Oil storage tanks account for 40 per cent of output.—Page 614.

Ingot scale loss cut more than 50 per cent.—Electrically heated soaking pits reduce scale loss to 0.75 per cent. Better steel, reducing of rolling mill power peak load, lower cost, and saving in space claimed for soaking pits heated electrically.—Page 617.

Automotive output up 15 per cent.—January production of automobiles and motor trucks was 241,052, as compared with 209,352 for December.—Page 636.

To save on foundry fire brick.—Use of three qualities of fire brick would give better results than using one quality for all purposes.—Page 612.

Cold melting vs. hot in gray iron foundries.—Cupola linings and castings damaged more by too much blast than not enough, says metallurgist. Better to melt iron hot and cool with scrap than to melt cold, with attendant increase in oxidation.—Page 612.

Action of metal-cutting tools observed under the microscope.—British investigators find that the average depth of cut is greater than the intended depth. So long as the chip comes off in a continuous ribbon, or breaks some distance from its root, the only wear on the tool will occur at a point some distance from the nose.—Page 669.

Where steel is made and where it goes.—Three-fourths of the country's steel is made in the East. More than half the East's output is consumed in the East. The remainder goes to supply the one-half the West needs but does not make, also the more than one-half the South can not provide for itself, and the four-fifths deficiency of the Pacific Coast in requirements over production.—Page 609.

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sum for their crops, and that the upward trend was continuing toward the end of 1924. The receipts of corn growers have been decidedly upward in general trend for three years. While showing a halting tendency at the end, they were higher than at any other point in the period covered.

After the general decline lasting to September, 1923, an upward trend in receipts from wheat sales began and at the end of the period the movement was a sharply advancing one. The index, however, had not yet attained the average level for 1921 and was considerably below that which existed at the beginning of the period covered.

Producers of milk have fared less well recently than most of the other important agricultural groups. Evidently the milk business is influenced more largely by the industrial cycle, and it moved sharply downward in 1924. This was due to higher feed costs, as well as to lower prices for milk. Since milk producing is perhaps third or fourth in importance among the agricultural group of industries, this is a rather striking situation.

In connection with all of the foregoing material dealing with earnings or purchasing power, it should be borne in mind that allowance is made for the quantity marketed each month. The general basis is to determine the margin between the price of the product or group of products and the cost of the raw material, fuel and labor. In the case of agricultural products, however, the price alone is considered, except for milk. Then the unit margins are multiplied by the estimated quantity marketed, and the resulting product is the basis for an index number for the month. In a word, both price and quantity are allowed for.

The Iron Age, Feb. 26, 1925

PIG IRON PRODUCTION IN 1923

Census Bureau Compares Tonnage and Value with 1921—Value Increased 140 Per Cent

More than $1,000,000,000 worth of pig iron was produced by 169 establishments in 1923, according to figures of the Census Bureau. This is an increase of 140 per cent over the $420,000,000 production of 134 plants in 1921. Of the $1,007,613,340 produced in 1923, only $305,268,953 was for sale, nearly 70 per cent of the total being consumed in further processes in the plants in which the iron was produced. In 1921 the salable products bore a still smaller percentage to the total, having been $112,251,353, or about 27 per cent. The cost of materials including fuel, in 1923, was $827,629,665, leaving $179,983,675 for the value added by the manufacturing process. Of this amount, approximately one-third or $58,935,384 consisted in the wages of 36,712 wage earners, compared with $29,369,685 in wages in 1921 for 18,698 wage earners.

Production of pig iron and ferroalloys in gross tons as given, and various details concerned with the items of production, are in the table. The horsepower used in 1923 was 1,832,919, while the coal consumed amounted to 1,285,523 net tons. This, of course, did not include the coal equivalent of the coke used in the blast furnaces.

Ferroalloys covered in the table do not include the tonnage made in electric furnaces, which aggregated 122,786 gross tons in 1923 and 43,315 tons in 1921. This addition makes the total production of blast furnace and electric furnace ferroalloys amount to 538,391 gross tons in 1923 and 225,431 tons in 1921.

	1923	1921
Pig iron and ferroalloys produced	40,162,855	16,618,493
For sale	10,603,193	3,852,275
For consumption where made	29,559,662	12,766,218
Pig iron produced	39,747,250	16,436,377
Basic	19,899,179	7,411,403
Bessemer	10,704,994	5,723,361
Foundry	6,791,418	2,613,332
Malleable	1,552,682	330,875
Low-phosphorus	310,888	201,731
Forge or mill	278,682	111,221
White, mottled and miscellaneous	134,347	25,637
Direct castings	75,060	18,817
Ferroalloys produced	415,605	182,116
Ferromanganese	259,677	103,717
Spiegeleisen	61,542	50,750
Ferrosilicon	88,828	22,170
Ferrophosphorus	5,193	5,479
Other	365	.....
Pig iron and ferroalloys produced, by fuel used:		
Coke	39,794,318	16,494,176
Charcoal	254,216	93,767
Other fuel	114,321	30,550
Pig iron and ferroalloys produced, by method of delivery:		
Delivered molten to steel works	24,660,813	8,884,764
Machine cast	11,625,650	5,773,618
Sand cast	3,397,693	1,781,902
Chill cast	403,639	159,392
Direct castings from furnace	75,060	18,817

Electric Ovens Used on Floating Foundry

The United States Steamship Medusa, the first naval vessel to be designed and built as a repair ship, is using electric heat for drying molds and baking cores. This ship, which has a displacement of 10,000 tons, contains equipment for turning out castings for almost any repair job aboard our warships, with the exception of the large main propelling engine castings. Besides the foundry, the following shops are included: Pipe shop, plating shop, sheet metal shop, optical shop, gyroscope repair shop, paint shop, blacksmith shop, boiler shop, machine shop, sail makers shop and pattern shop.

The melting equipment consists of a 3½ and a 1-ton cupola and four 700-lb. brass crucible furnaces. For baking cores an electric oven was built by the Westinghouse Electric & Mfg. Co., 7 ft. x 7 ft. 10 in. and 7 ft. 6 in. high. Double doors are provided. A truck on rails is used for handling large cores, and shelves in the upper part of the oven take care of the smaller cores. On each side of the oven are mounted five 2.5-kw. Westinghouse type C oven heaters. A blower driven by a 1/6-hp. motor is mounted on the top of the oven for exhausting fumes and gases from the oven. The oven is equipped with graphic recording automatic temperature control apparatus.

The mold drying oven is similar to the core bake oven, the only difference being that the stationary shelves are omitted. The handling truck completely fills this oven.

Wellman-Seaver-Morgan Changes

The Wellman-Seaver-Morgan Co., Cleveland, at its annual meeting Feb. 17, increased its board of directors from nine to 10 members and elected five new directors. The new members of the board are James Smith and Frederick Sanderson, of the Wellman-Smith-Owens Co., Ltd., London; Frederick Stadelman, New York, and George P. Steel and H. P. Glidden, Cleveland. The election of the two Englishmen as members of the board resulted from the recent purchase of a majority of the common stock by interests affiliated with the London corporation. Mr. Smith, one of the new directors, recently came from England and is taking an active interest in the affairs at the Wellman-Seaver-Morgan Co. plant. Mr. Stadelman is in charge of the company's sales in New York, and Mr. Glidden, another new director, is sales manager at the headquarters in Cleveland. Edward S. Church, president, and other officers were re-elected.

ESTABLISHED 1855

THE IRON AGE

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Original Cost vs. Present Value

THE second greatest public utility of the United States is the Consolidated Gas Company of New York, which supplies the people of the metropolis with gas and electricity. In connection with some recent financing this company communicated interesting information, to the effect that its properties represent an investment of over 555 million dollars and that it would now cost more than 850 million dollars to replace them. They supply the needs of a population of more than 4,000,000.

Such huge figures make but little impression on the average man, whose affairs are measured in hundreds of dollars rather than in millions. Let us, therefore, translate them into terms of the average family of four persons. Such a family in New York enjoys the use of lighting and power plant that originally cost $550 and would cost $850 if it had to be reinstalled now. Of course this does not mean that such an investment is associated with the immediate family abode and affairs, but it does represent what each family requires for living and working in the city. We may suggest that a family living in the country and having to provide an individual acetylene gas and Delco electric plant would not get so much for the same money.

In recent years the Consolidated Gas Co. has been earning about 6.5 per cent on its investment, exclusive of its working capital. The opinion has recently been expressed by a master of chancery that the company is entitled to earn 8 per cent on the reproduction value of its property, plus working capital. Several high courts have rendered the opinion in public utility cases that reproduction value or present value, not past value nor original cost nor anything else, is the true measure by which the earning power of such a corporation should be gaged.

An investor who built a row of houses 10 or 12 years ago at a cost of $5,000 per house expected to get an annual rental of $500, which he figured as 10 per cent gross and probably 6 per cent net. Since then the cost of building houses has doubled, while the rate of rental has increased in somewhat the same proportion, or say to 1.8 times what it used to be. The latter applies not merely to new houses, but also to old ones, and if the latter be bought and sold, the same principle governs in the transaction. In other words, it is present value that rules, not original cost.

We have, then, two rules of practice in respect to two kinds of capital goods. As to one the law of supply and demand obtains and the fortunate owner of property is permitted to enjoy appreciation in value and even to liquidate it, or cash it in. If, on the other hand, property be owned by a corporation, and especially by a public service corporation, its value is not supposed to appreciate, and indeed the owner is lucky if it escapes confiscation, which is practically what La Follette has wanted to do as to the railroads.

Fortunately our courts have interposed a strong obstacle against such projects; and it may happen in the course of time that corporations will be allowed to earn income commensurate with present value, just as do the owners of other property.

Census Pyramiding

SUMMARIZING the returns from nearly 200,000 manufacturing establishments, the Census Bureau reports for 1923 a total of 10,176,750 persons engaged in the industry, of whom 8,763,233 were wage earners. In 1919 there were 9,000,059 wage earners. The total value of products in 1923 is given as $60½ billions, compared with $62 billions in 1919 and with $24 billions in 1914.

Comparison of dollar values with 1914 has relatively little meaning, because of the greatly increased unit prices. As between 1919 and 1923, however, it is estimated that the fall in unit prices has much more than neutralized the small drop in value of products. In fact, the output of manufacturing industries, measured in quantities instead of values, shows an increase estimated at

19 per cent in 1923 over the corresponding quantities of 1919. That this increase should have been recorded in face of a decrease of nearly 3 per cent in number of wage earners and 5 per cent in the total number of persons engaged indicates either a larger use of machinery or a higher efficiency of operation, or both.

In considering any statistics such as those given by the Census Bureau it must be remembered that in thousands of cases the finished products of one plant become the raw materials of another. As the figures given represent the summation of reports from all plants, it follows that there is inevitably much duplication. For instance:

A blast furnace plant producing basic iron sells that iron as its finished product. A steel works buying that iron and turning it into steel ingots and then into sheet bars, performs a further process upon it and again the total value of the product is reported. These sheet bars, sold to a sheet and tin plate plant, have further manufacturing work done on them and again the report is made of the total value, augmented by the intermediate costs and profits. The tin plate sold to a can manufacturer is made into cans, whose value again is reported, still higher than that for the tin plate. These cans, delivered to Mr. Heinz, are filled with his products and the whole shipped out as another link in the chain. The price he had to pay for the tin can is a part of the total reported value of his products, and the summation of the successive mounting totals for all of these tin cans, made from the original ton of pig iron, amounts to many times the price at which that ton was sold.

It is such cases as this that make the total value of manufactured products of less interest to the economist than the figure for "value added by manufacturing." This item is explained as the difference between the total production value and the cost of all materials, including fuel and containers. Out of the "value added" must come all wages, taxes and other expenses. What is left, if anything, becomes profits.

Stronger Aluminum Alloys

WHILE steady progress has been going on in the application of the principles of heat treatment to steel, some notable achievements have been registered in far different fields. The most recent instance is found in the announcement of the perfection of two new strong aluminum alloys, some of the details of which are presented on other pages of this issue. Investigators have taken combinations of metals similar to duralumin and, aided by the fundamental principles of physical metallurgy and of heat treatment as applied to steel, have created superior products. By adding a small amount of copper in the one case, and of magnesium and silicon in the other case, the light metal aluminum has been transformed by heat treatment into materials as strong as mild steels and having unusual promise in engineering applications. Increase in tensile strength of nearly 50 per cent and marked improvement in hardness are among the radical changes brought about in the alloys. An increase in hardness from 28 to 120 by heat treatment is alone of special note among non-ferrous alloys.

The various steps in the investigation which culminated in success are a revelation of what may be done. They may be regarded as prophetic of what further study of the application of heat treatment may reveal in the case of the lighter metals and their alloys.

Future of Commodity Prices

MOST men have noticed, and not a few have commented on, the spirit of opposition that exists among buyers to price advances. The feeling is rather general among buyers. In appraising the extent of this feeling, one must not be misled by the approval many men have given to the advances in prices of farm products. Generally these men are either bankers who are gratified by the prospect of farmers paying their debts, or manufacturers who are hopeful that farmers will now buy their goods.

This spirit as shown may be characterized as unusual. There was no similar exhibition in the past, on the occasion of quicker and greater rises. There was a disposition to condone advances on the ground that costs were rising or to accept them gracefully in expectation that the extra could be passed on to somebody else, probably with an increment. One may assume, or at least suspect, that dissatisfaction with price advances nowadays comes from reasoning that the views mentioned are not applicable to present circumstances.

Except for a very slight recession in September, the general rise has been continuous since last June, when the Bureau of Labor index number stood at 144.6, while for January it has just been reported at 160.0, making an increase of 10.6 per cent in seven months. As some sluggishly moving commodities act as a drag, the rise in the fluctuating commodities is greater than is indicated by the general price index. The largest increases were in farm products and foods, 22 and 18 per cent respectively, while metals and metal products advanced only 3 per cent.

It is not with details that the present reference is concerned. For the long future, involving the general buying power of the dollar, it is of minor consequence which commodities fluctuate. If half the commodities remain stationary and half advance 20 per cent, it is much the same as if all advanced 10 per cent.

There has been a widespread belief, resting on many cogent arguments, that prices should decline for many years after the war. Now that six years have elapsed, the course of affairs should be surveyed. Has the decline been in progress? If not, ought the belief to be abandoned or the conclusion adopted that time lost may eventually be made up?

For convenience, in reading figures, the Bureau of Labor's index numbers, based on 1913 averages, may be translated into index numbers

based on the average of the past six years, as follows:

Commodity Prices at Wholesale

	1913=100	1919-24=100
1919	206	120
1920	226	131
1921	147	85
1922	149	87
1923	154	90
1924	150	87
Average	172	100
January, 1925	160	93

No very strong swing is seen. In the six years, we started with two very high years, which pulled up the average. Then we had four years which were pretty much the same, but the last two were slightly higher than the two middle years. Mere absence of decline would, however, be significant, and we have more than mere absence, while January of this year is above the average of any of the four preceding years.

Certainly this fact, which is a fresh fact, deserves very serious consideration. One does not observe the rise of any disposition to abandon the general theory that prices should fall for years after the war. Should any number of men develop such a disposition, it would be the signal for conservative and long range observers to exercise still more caution.

Not much deflation in prices can occur through reduction of profits, for profits have not been large. There is little prospect through wage reductions, which are not popular. Reduction in costs is the chief hope, always sought, but more likely when necessity drives.

In the past three months there have been many expressions of fear lest there be inflation, with frequent reference to the large amount of gold in the United States. Many men no doubt have failed to take this reference seriously, being informed of the elementary fact that while the value of our circulation is based on gold, the quantity is not based on the quantity of gold in the country, but is regulated by the Federal Reserve Board. Prices in the United States are influenced by prices in the world at large, and with world prices the point is not that the gold is in the United States but that it is not somewhere else. Other countries are transacting business without gold, and it is much the same as if each had an extra supply of gold, over and above the amount which really does exist. If or when they displace the present basis with gold there will be a deflating influence.

Business and War

OWEN D. YOUNG, long known to the electrical world as a man of marked ability, extended his fame greatly in assisting in establishing the Dawes Plan, so much so in fact that associates in the work abroad say that Europe is likely to call on him should things again get into an impasse. In an address which he delivered Monday of this week at the commemoration day exercises at Johns Hopkins University, he demonstrated that he is a man of broad ideas and of decided originality in presenting them.

"I rise, Mr. President, on a matter of business," was the almost startling statement which Mr. Young made after receiving the honorary degree from the university. He referred to the traditional way of expressing appreciation for such a degree—the delivery of an oration or a scholarly treatise to justify the judgment of the trustees in selecting the recipient for the honor. With a touch of humor, Mr. Young announced that he would undertake "no such hopeless task." He stated the "business" which he had in mind: the establishment of the Walter Hines Page School of International Relations; and he explained it as entirely reasonable to expect international good will to be promoted by practical, scientific, businesslike methods, for he believes that disease in international relations can be destroyed just as many diseases have been all but eradicated by the progress of science. "The health of the world must be guaranteed," he said. "This must be done by preventive research rather than by the surgery of war." He is firmly of the opinion that the Page school will achieve three things:

"First, it will develop a science of international relations. Second, it will ascertain the facts, so far as they can be found, on any particular problem, and third, it will produce a continually growing body of men trained in that science and available for service in the fields of education, government and business."

After this concise statement Mr. Young added:

"Our contacts with the world at every point should show more conductivity and less useless sparking."

This epigrammatic and forceful statement was supported by an argument, too lengthy even to outline here, one that will appeal to the business men of the country, especially to steel manufacturers, who, although so often charged with encouraging war, have proved themselves ready to do anything in their power to prevent it.

Pratt & Whitney Co. Veteran Employees Are Honored

The annual banquet of the Pratt & Whitney Co., Hartford, Conn., held on the evening of Feb. 18, was marked by an unusually impressive feature. Eighty-four veteran employees, all with records of 25 or more years in the service of the company and two with 57 years to their credit, were awarded service buttons in blue and gold. In the center of each button was P. & W. on a blue band and around the P. & W. were the words in gold "Quarter Century Service." C. R. Burt, general manager of the company, presided and presented the buttons. James K. Cullen of New York, president of the Niles-Bement-Pond Co. and the Pratt & Whitney Co., delivered an appropriate address referring to a number of men who received their early training with the company and became eminent manufacturers and inventors. He said that a slogan of the company could be "Safety, Quality, Quantity." This would mean safety for the employees, quality in their work and such skill and efficiency that the quantity could be produced without sacrifice of quality and undue cost.

Others who spoke briefly were Edward L. Leeds, general sales manager; Charles M. Pond, small tool manager; J. Carlton Ward, Jr., factory manager; Jeremiah J. Coffey, blacksmith foreman, and William H. Miller, Hartford sales manager. The two employees who had served 57 years were F. W. Woodworth and Jeremiah J. Coffey, while W. G. Buntin had 51 years to his credit.

MORE CHEERFUL FEELING

Youngstown Steel Makers See Prospect for Good Increase in Orders

YOUNGSTOWN, Feb. 24.—Together with the actual improvement which has taken place in the steel industry within the past week, resulting in a more liberal release of specifications and broader second quarter buying, is a heavy overhanging demand which makers feel will gather strength in the spring.

The Sharon Steel Hoop Co., for instance, reports that the working off of unfilled orders is engaging its sheet and strip mills at a capacity rate, and that current buying is being done in fair volume. H. T. Gilbert, the company's general manager of sales, looks for a strong buying movement to develop at an early date which will completely overcome slackness that has appeared in the market in the past three weeks. He predicts that the motor industry will produce as many automobiles in 1925 as in 1924.

Surplus business continues to come to mills farther east from consumers in the Chicago district, owing to inability of producers in that territory to meet current requirements.

Strip makers in this territory are observing new hot-rolled prices at 2.50c., with new extras, while cold-rolled strip ranges from 4.15c. to 4.25c. per lb., Pittsburgh.

Independent tin plate makers are sharing in the business which has been released within the past month, and tin plate capacity has been operated at a consistently high rate. The Trumbull Steel Co. regards this as one of its most profitable departments, at present, and reports satisfactory earnings from its tin plate division. Just prior to the last national election the company acquired a substantial stock of pig tin at the low prices then prevailing. The company also reports earnings from its strip department. Its least advantageous product, from the standpoint of earnings, has been sheet steel, because of fluctuations in the market and price weakness due to keen competition for going business.

The Trumbull company is still obliged to enter the open market from time to time for semi-finished steel purchases, on account of the inability of its seven open-hearth furnaces to meet its steel needs. While additional capacity has been discussed, no formal authorization to proceed with such construction has yet been given.

Non-integrated sheet rollers have not been absorbing the tonnages of semi-finished steel, particularly sheet bars, which it was anticipated they would need, and this condition has been partly responsible for the reduction in ingot output in the Mahoning Valley. Makers had also built up sizable stocks because of the consistently high production rate maintained for three months.

More encouraging factors have developed in the steel market situation the past week, leading makers to believe that earlier predictions of capacity demand in the spring will be realized.

Pilger Mill to Be Installed by Pittsburgh Steel Products Co.

The 12-in. seamless tube mill, which is to be installed by the Pittsburgh Steel Products Co. at Allenport, Pa., is to be a Pilger mill, to be built by the Deutschen Maschinenfabrik A. G. (the Demag Co.), Duisburg, Germany, and not as first reported by the company having American rights to the Peters patents. The German company is represented in the United States by H. L. Schreck, until recently chief engineer, Wheeling Steel Corporation, Wheeling, W. Va. The company already has made 15 installations of seamless mills in Europe. Otto Bamberger, technical director of the company, is making an American tour, looking over prospective additional American installations.

Plate Fabricators Organize

Representatives of 28 leading plate fabricators of the country assembled at the Harvard Club, New York, on Feb. 4 and effected the organization of the National Association of Tank and Steel Plate Fabricators. As its chief aim, the organization plans by united effort to arrive at a better understanding of problems which the members have in common. It is hoped that the group may act to eradicate evils which have been present for a long time in the industry. Meetings will be held regularly four times a year and are to be preceded by preliminary gatherings of sectional groups, for the purpose of crystalizing thought on problems to be presented for discussion at the full assembly. The next meeting will be held on May 6 at a place to be determined later by the executive committee.

George R. McAleenan, president McAleenan Brothers & Co., Pittsburgh, was elected president of the association; Phillip Graver, president Graver Corporation, East Chicago, Ind., vice-president; S. W. Mifflin, attorney, 500 Stock Exchange Building, Philadelphia, secretary-treasurer. George P. Bard, 1 Broadway, New York, was elected to honorary membership. President McAleenan appointed a committee to confer with the American Institute of Steel Construction, New York, on methods of cooperation. At the meeting Feb. 4 discussion centered on "Storage and Handling," also on standard erection conditions, engineering expense and advertising.

As a nucleus, the national organization used two established sectional associations and four similar groups still in the formative stage. The officers of the Middlewestern section, embracing territory contiguous to Pittsburgh, are Mr. McAleenan, president; J. P. Keene, Youngstown Boiler & Tank Works, Youngstown, Ohio, vice-president, and Arthur Huehn, James McNeil Boiler Co., Pittsburgh, secretary. Officers in the Eastern section centering in Philadelphia are: James Loughlin, Dover Boiler Works, Dover, N. J., president; William W. Posey, vice-president, and Mr. Mifflin, secretary.

Steel Company Leases Railroad

BIRMINGHAM, ALA., Feb. 24.—Looking to reduced costs in hauling coal and coke, the Sloss-Sheffield Steel & Iron Co. has leased 16 miles of trackage rights from the Louisville & Nashville railroad and will build four miles of track to handle coal and coke from the Flat Top coal fields, 20 miles from Birmingham. Coal from this field is used in the by-product coke oven plant at North Birmingham and bee-hive coke ovens at Flat Top produce considerable coke. The Sloss-Sheffield company will buy a locomotive and 200 cars with which to operate its own railroad. It estimates that within a short time the savings will recompense the company for the expenditure. The road will be completed by August.

Scrap Market Weak at Youngstown

YOUNGSTOWN, Feb. 24.—Weakness continues to pervade the scrap market, though dealers say prices are susceptible to demand and predict a quick advance, should requirements for early delivery materialize in any substantial way. Prices ranging from $18.50 to $19.50 for heavy melting are heard. Undoubtedly some distress tonnages which have appeared in this district have been in a measure responsible for the price weakness in consuming areas, but the chief reason seems to be in the price slackness in some of the main scrap producing centers. Dealers continue to buy carefully, but in some cases are building up stocks against anticipated heavier demand in the spring. Melters are showing a livelier interest in the market than formerly, and are contracting for tonnages at prevailing levels, feeling with dealers that a reaction will come in the market which will cause prices to rebound.

Slight Improvement in Employment in Pennsylvania

HARRISBURG, PA., Feb. 23.—Slight improvements are noted in iron and steel trade employment conditions in the semi-monthly report on Pennsylvania labor conditions to R. H. Lansburgh, secretary of Labor and Industry, as of Feb. 16. In no district were poorer conditions reported.

Pittsburgh has had increases in the demand for high class workers on the rolls and other operations pertaining to the steel mills, and a scattered demand for laborers and chippers. The demand for machinists and machine hands is low.

At Harrisburg, where machine tool works, typewriter plants and other concerns have been operating under capacity, they are now declared operating at capacity.

Few men are being added by the mills in the Johnstown district. Little change has been noted during the last two weeks. The Reading office has been advised that the Carpenter Steel Co. has experienced slight improvement.

Allentown has experienced better conditions. There is a demand for thoroughly experienced workmen. Erie has had a moderate improvement. Williamsport plants apparently are operating on a normal basis, and few capable men are available. Work is expected to continue steady. DuBois railroad shops are working regularly, and in some cases men are doing overtime work. Scranton has noted no improvement, with most shops operating either on part time or with reduced forces.

Automobile Production in January

January production of motor vehicles is reported by the Department of Commerce at 212,908 passenger cars and 28,044 trucks, compared with 182,028 passenger cars and 27,324 trucks in December, and with 293,822 passenger cars and 30,627 trucks in January, 1924. Of the current total, 204,607 passenger cars and 26,464 trucks were made in the United States and 8301 passenger cars and 1540 trucks in Canada. With the exception of November and December, 1924, the current month's production of passenger cars is the smallest since December, 1922. With the exception of July, November and December, 1924, the current month's production of trucks is the smallest since February, 1923.

Canada Made 4 Per Cent

Segregation between the United States and Canada has been made by the Department to cover all months of 1924. The total output of passenger cars during that year is given as 3,262,280, of which 3,144,515 were made in the United States and 117,765, or 3.6 per cent, in Canada. Of trucks the total production was 375,426, of which 358,296 were made in the United States and 17,130, or 4.6 per cent, in Canada.

New Chairman of Engineering Foundation

The election of Lewis Buckley Stillwell, New York, as chairman of the Engineering Foundation, to succeed Charles F. Rand, chairman since 1920, was announced following a meeting of the Foundation board held in New York, Feb. 11.

Mr. Stillwell is past president of the American Institute of Electrical Engineers and the American Institute of Consulting Engineers. He is a native of Pennsylvania and a graduate of Lehigh University. Following graduation he was connected with the Westinghouse Electric & Mfg. Co., serving as chief engineer from 1890 to 1898. He was active in the construction of the Niagara Falls Power Co.'s first plant, was that company's electrical director for three years, and has been identified with other large electrification projects since that time. He is a member of the American Society of Civil Engineers, as well as of several other societies and clubs.

Other officers of the Foundation include Edward Dean Adams, first vice-chairman; Elmer A. Sperry, second vice-chairman; J. S. Langthorn, treasurer; Henry A. Lardner, assistant treasurer, and Alfred D. Flinn, director and secretary.

It has also been announced that the four founder societies are planning to increase the endowment of the Foundation, established by Ambrose Swasey with a gift of $500,000 and recently supplemented by a bequest of $50,000 under the will of Henry R. Towne. One proposal at the meeting was that the endowment be raised to $20,000,000.

Diamond Service Emblems Presented

Diamond service emblems have been presented by the American Engineering Co., Philadelphia, to 32 of its employees who have been with the company for 25 years or more. Gold medals were presented to 275 other employees with records of 5 to 25 years' service. Among those receiving the diamond medals were two machinists with records of 46 and 45 years active service. Both are still employed daily in the shops of the company.

Preparing to Increase Production

YOUNGSTOWN, Feb. 24.—Fabricating interests in this district are planning to broaden production, and are feeling the accelerating effects of advance spring building requirements. Gustave Kahn, vice-president of the Truscon Steel Co., states that output will advance early in March from the current 70 per cent rate to higher production.

The General Fireproofing Co. is maintaining output at 80 per cent, and reports better inquiry for metal furniture and steel fireproofing products entering into building construction.

The Kalman Steel Co. has enlarged production at its Youngstown plant, where it produces reinforcing steel bars for the Eastern trade, to 40 per cent from a 30 per cent rate.

The William B. Pollock Co., blast furnace builder, is running at 60 per cent.

Action on Billet and Wire Rod Rate Deferred

Final action was deferred on the question of the acceptance of the railroad proposal limiting the billet rate of freight on wire rods to round ones and the lifting into a higher classification rods of other shapes at the conference of producers and consumers held at the Chamber of Commerce of Pittsburgh, Wednesday, Feb. 18. There was an all day session, with A. R. Kennedy, traffic manager, Pittsburgh Steel Co., presiding. It was the sense of a majority of those present that the railroad proposal be accepted, this on the ground that insistence on the part of mills and users that material properly belonging in a different classification be continued as billet rate material might lead to an opening up of the entire semi-finished classification, which might mean a rate covering only billets and to skelp and some other partially finished forms of steel being placed on a higher basis of rates. Some users of rods were not represented at the meeting and formal adoption of the railroad recommendation was deferred to give these interests a chance to be heard.

The Yosemite Portland Cement Corporation, Fresno, Cal., has announced its incorporation and the completion of plans for the construction of a mill at Merced, Cal. The company is incorporated for $1,500,000 and has a mill site at Merced and valuable limestone quarries in Mariposa County. Preliminary work has already been done and some of the machinery has been installed. The plant will start operations as a modern wet process mill with a capacity of 2000 bbl. daily. A. Emory Wishon of Fresno is president.

RAILROAD LIST OF 63 TOOLS

Illinois Central, Previously Inquiring for Smaller Number, Completes List

CHICAGO, Feb. 24.—In addition to the Illinois Central Railroad's 19 items of machine tools reported on page 675 of this week's issue, new inquiry for 41 more tools brings the complete list, with which is included the three tools mentioned last week, to 63 machines. The following includes the latest part of the inquiry, calling for the 41 additional tools:

One vertical drill press with capacity up to 1¼ in.
One small upright drill with equipment for tell-tale hole drilling in staybolts, capacity to ½ in.
One horizontal staybolt threading machine for turning and threading crown staybolts and threading radial stays.
One 84-in. face grinder for grinding locomotive guide bars and other work.
One 36-in. x 18-ft. heavy duty engine lathe.
Two medium size hand-power arbor presses.
One 14 x 2 x 1¼-in. double floor grinder.
One double head twist drill grinder to grind twist drills up to 2½ in. in diameter.
One tool room universal cutter and reamer grinder.
One 20-in. tool room crankshaper.
One 16-in. x 10-ft. tool room lathe.
One 1½-in. and 2½-in. double head bolt cutter.
One 12-in. x 6-ft. portable engine lathe.
Two 12-in. x 6-ft. bolt lathes.
One 18-in. x 8-ft. heavy duty lathe.
One 24-in. x 10-ft. heavy duty lathe.
One centering machine.
One 24-in. heavy duty crank shaper.
One sensitive drill with capacity up to ½ in.
One 20-in. drill press.
One medium heavy-duty upright drill with capacity up to 2 in. and 30-in. table.
Three 5-ft. heavy duty radial drills.
One 16 x 6-ft. engine lathe.
One 4-in. pipe threading machine to cut and thread ½ to 4-in. pipe.
One 500-lb. motor-driven helve hammer.
One 200-lb. vertical press with equipment to drive crown brass work and rod bushings.
One 54-in. heavy duty vertical turret lathe.
One 2500-lb. steam hammer.
One combination link and internal grinder.
Three portable direct current arc welding machines.
One 30-in. swing cut-off saw.
One 2-in. capacity combination mortising and boring machine.
One 36-in. band saw.
One 10 to 12-in. universal wood-worker.
One 30-in. rip saw table.

Youngstown Steel Car Door Co. Operations

Operations were recently started in Cleveland by the Youngstown Steel Car Door Co., in which the Youngstown Sheet & Tube Co. and leading stockholders in it, are interested. James A. Campbell, president of the Youngstown Sheet & Tube Co., is president of the newly formed company. For the time being the products are being manufactured under a contract arrangement by the Midland Steel Products Co., Cleveland. Later it is expected to establish a plant at Youngstown.

The initial order was received from the Chicago, Burlington & Quincy Railroad, and other important business is pending. The company is said to have very little competition in its field.

Samuel Mather, J. L. Severance, Harry G. Dalton and Harry Colby are among the Sheet & Tube company stockholders interested in the new venture.

Stockholders of the Electric Alloy Steel Co. and the Atlas Crucible Steel Co., components of the defunct Atlas Steel Corporation, Dunkirk, N. Y., are being given an opportunity to participate in the Atlas Alloy Steel Co., successor to the Atlas Steel Corporation, under a financing arrangement announced last week. The reorganized company is making an offering of 1000 shares of prior preference preferred of $100 par value, and 2500 shares of non-par value common to former stockholders of the constituent interests. Subscription rights terminate March 16. The stock is being offered through the Western Reserve Securities of Jamestown, N. Y.

RAILROAD EQUIPMENT BUYING

Rock Island Buys 1600 Cars—Industrial Buyers of Locomotives and Cars Prominent

New inquiries for cars were relatively light this week with only about 300 reported. Purchases, however totaled more than 1800. Of this figure, 1600 cars were placed by the Rock Island. Inquiries for 12 locomotives were reported, but close to 40 were purchased. Half of this total was made up of the award by the St. Louis-San Francisco of 15 Mikado and 5 Mountain type. Industrial users of locomotives and cars continued prominent in the equipment field.

The Rock Island has closed on 1200 box cars and 400 gondola cars with the American Car & Foundry Co.

The Quaker City Tank Line has placed 200 tank cars with the Standard Tank Car Co.

The American Rolling Mill Co. has awarded 3 75-ton ore cars to the American Car & Foundry Co.

The Republic Iron & Steel Co. is in the market for 8 steel gondola car bodies.

The Canadian Pacific has asked for prices on the repair of 1200 cars.

Swift & Co., Chicago, are in the market for 300 refrigerator cars and 300 underframes.

The Seaboard Air Line has placed 80 underframes for cabooses with the Richmond Car Works.

The Canadian Salt Co., Ltd., Windsor, Ont., has purchased 5 tank cars with 15-ton chloride tanks, from the American Car & Foundry Co.

The Victoria Railways, Australia, have purchased 12 hopper cars, 2 gondola and 2 flat cars and 2 Louvre cars from the American Car & Foundry Co.

The Huron Portland Cement Co. has closed on 5 50-ton steel hopper ore cars with the National Dump Car Co. and the American Car & Foundry Co.

The St. Louis-San Francisco has purchased 15 Mikado type and 5 Mountain type locomotives from the Baldwin Locomotive Works.

The Cornwall Railroad has closed on one Consolidation type locomotive with the Baldwin Locomotive Works.

The Denver & Rio Grande Western has purchased 10 narrow-gage, Mountain type locomotives from the Baldwin Locomotive Works.

The Tatum Lumber Co. has purchased one Mikado type locomotive from the Baldwin Locomotive Works.

The Unity Railroad has ordered one Consolidation type Locomotive from the Baldwin Locomotive Works.

The Midland Valley Railroad has purchased 5 Mikado type locomotives from the Baldwin Locomotive Works.

The Carnegie Steel Co. is in the market for three 6-wheel switching locomotives.

The Kansas City, Mexico & Orient is in the market for 4 Mikado type locomotives.

The Central of Georgia Railroad is inquiring for 5 Mountain type locomotives.

The South African Railways is in the market for 6 first-class coaches, 2 third-class coaches, 39 first-class side-door suburban coaches and 21 second-class side-door suburban coaches.

Representing an investment of more than $106,000,000 in plant and equipment, 333 establishments in Canada manufacturing products from metals, other than iron and steel in 1923, produced commodities having a total selling value of $88,000,000 and a value added by manufacturing of more than $45,000,000, according to a report just issued by the Mining, Metallurgical and Chemical Branch of the Dominion Bureau of Statistics, Ottawa. Chief among these industries, from the point of view of both capital investment and of production volume was the manufacture of electrical apparatus and supplies. This industry gave employment to 13,268 persons and produced goods having a value of $51,864,400 in 1923.

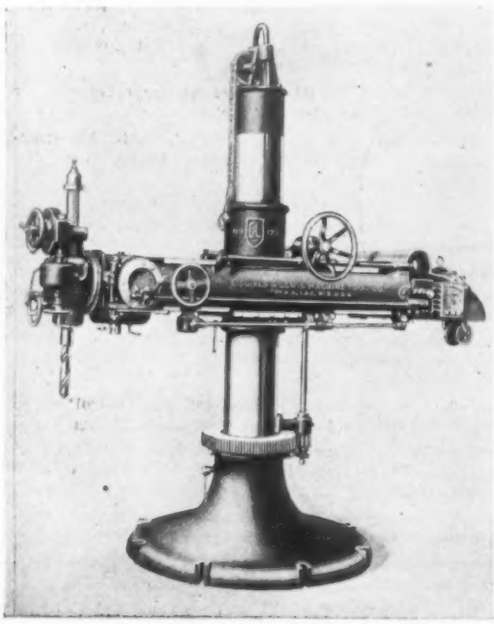
Following authorization some time ago, the Carnegie Steel Co. is proceeding to install additional finishing mills at the McDonald works in Trumbull county, Ohio. As much of the work as possible will be done by the company's own organization. Three units are to be added this year to the six-mill McDonald plant, for a total of nine.

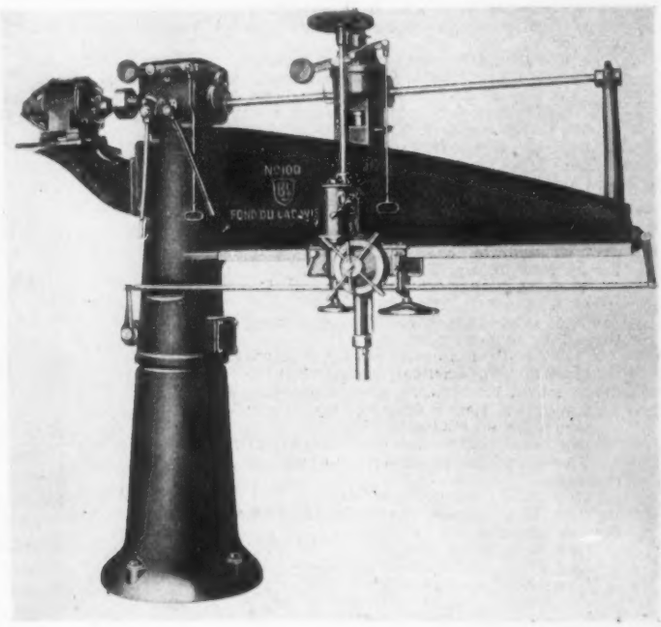
LARGE PORTABLE DRILLS

Universal Radial, Boiler and Fire Box and 6-ft. Plain Radial Types

The three drilling machines here illustrated, one of which is a portable universal radial, another a portable universal boiler and fire box drill, and the third, a 6-ft. plain radial, are being offered by the Giddings & Lewis Machine Tool Co., Fond-du-Lac, Wis.

The portable universal radial drill, shown in the left-hand illustration, is available in four sizes, for drilling holes from 1⅝ in. up to and including 3 in. in diameter, and is especially adapted for use on large work which cannot be moved advantageously to stationary drilling or boring equipment. The universal adjustment of the drill spindle unit not only permits the drilling, boring or tapping of holes in any direction, but makes possible the drilling of holes in places which might otherwise be inaccessible. In the general design of the machine, particular heed is said to have been paid to overcoming the difficulty of drilling holes in proper alinement.





The Portable Universal Drill Is Shown at the Left. Universal adjustment of the drill spindle unit permits drilling, boring or tapping of holes in any direction, and also permits of drilling holes in places which otherwise might be inaccessible. The arm of the plain radial drill, shown at the right, may be rotated 360 deg. around the column, but has no vertical adjustment. It is particularly adapted for drilling tank and boiler plates, beams, columns and other structural material

The column is of heavy tubular section and well braced. The arm, which is of box-type construction, is mounted in a saddle with sleeve which has a movement of 360 deg. around the column and is also provided with a device for clamping. This device is operated by a lever on the head. The arm is counterbalanced, as shown, the counterweight being arranged to slide within the column. Angular adjustment of the radial arm up to 20 deg. in both directions from horizontal is provided to give a larger range of operation to the drill spindle unit. Further flexibility in the operation of the machine is obtained by having the drill spindle unit adjustable, at right angles to the arm, through 360 deg. and, in the same plane as the arm slide, through 180 deg. The spindle head is quickly and securely clamped by a closing cam. The spindle is of high carbon steel, runs in bronze bearings, and is provided with ample oiling facilities. Spindle thrust is taken by a large ball thrust bearing.

The speed and feed box is a self-contained unit. For the two smaller machines, there are six speeds and two feeds and for the larger machines nine speeds and six feeds. The levers and hand wheels for changing speeds and feeds are located within easy reach of the operator.

The driving motor is mounted on the radial arm and on the smaller machines is connected with the drill spindle unit by belt; on the larger machines through shaft and gears. The motor bracket is adjustable to suit the different motors which may be used. The equipment includes a winding reel with 30 ft. of cable for connecting the motor to the available current supply.

The maximum distance from the center of the spindle to the column ranges from 44 in. to 100 in. in the smallest and largest machines, respectively. The maximum distance from the floor to the center of spindle head swivel ranges from 88 in. in the smallest machine to 140 in. in the largest.

In weight the four different sizes range from 5000 to 30,000 lb. The two smaller sizes are either mounted on four-wheel trucks or on runways, while the two larger sizes are mounted either on round bases or on stationary runways. The portable base is of heavy girder construction, ribbed, and provided with a planed runway to carry the column base. A rack and pinion with ratchet lever are provided for moving the machine on the runway. The truck type runway is steadied when in use by four heavy screws, with pads, as shown in the illustration of the boiler and fire box drill. The stationary runway is similar in construction to the truck base except that a ratchet jack for moving the machine on the runway is furnished. The round base is provided with bolt holes for mounting the machine on floor plates. A lifting eye on the top of the column has been provided so that crane hooks may be inserted when it is desired to move the machine from one part of the shop to another.

Boiler and Fire Box Drill

The boiler and fire box drill, shown in the separate illustration, is made in two sizes and is adapted to drilling, boring and tapping work in locomotive and car manufacturing plants, tank and boiler works, and in locomotive and car repair shops. It is said to be especially suited for drilling out broken staybolts and retapping and setting new staybolts.

This machine has a column of tubular section, which after being machined, is ground to finish diameter and

balanced. The drill spindle unit is self-contained, and has a sleeve with long bearing to assure correct alinement on the column. Power traverse is provided for moving the spindle head on the column and complete spindle unit can be clamped to the column at any desired location. A segment on the spindle head permits the setting of the drill spindle at an angle of 30 deg. from the center line of the column in either direction. The smaller machine will drill holes up to 1½ in., will bore with cutters up to 3 in., and will tap up to 1¼ in. The larger machine will drill holes up to 2¼ in., bore with cutters up to 4 in., and tap up to 2 in. The smaller machine has four spindle speeds and two feeds, while the larger machine has six spindle speeds and two feeds. The maximum distance from the floor to the center of the spindle swivel is 84 in. for the small type and 104 in. for the larger type.

The spindle unit is counterbalanced through chains, sheaves and counter weight, the latter sliding in the column. The machine is provided with a compact motor drive, the motor being mounted on the spindle unit and the power transmitted to the speed box through gear and pinion. A winding reel with 30 ft. of cable for making electrical connections is furnished.

The machines may be mounted either on four-wheel truck or on stationary runways. The smaller machine ranges in weight from 4000 to 4500 lb. and the larger from 9500 to 10,000 lb., according to the mounting. The larger machine is equipped with segment, worm and ratchet lever to permit a 30-deg. movement of the column in either direction.

Plain Radial Drill for Variety of Work

The 6-ft. plain radial drilling machine, shown in the right-hand illustration, is intended for use in boiler shops, structural and bridge works, car and railroad shops. It is particularly adapted for drilling tank and boiler plates, beams, columns and other structural shapes. Holes up to 2 in. in diameter may be drilled in solid steel.

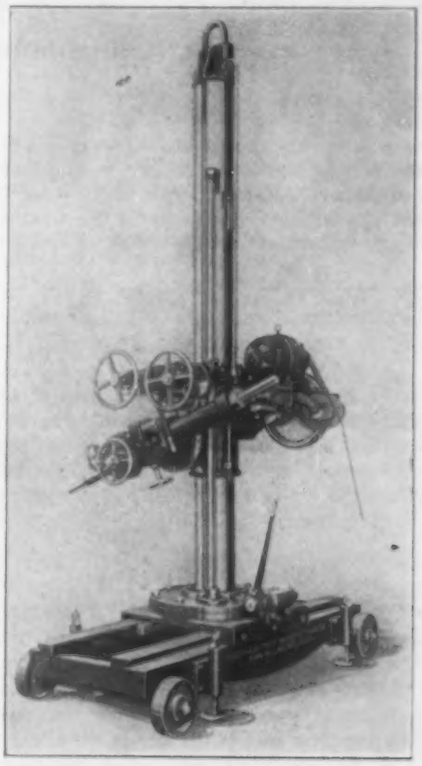
In this machine there is no vertical adjustment of the radial arm, but it may be rotated 360 deg. about the column. It revolves on roller bearings and a large thrust bearing is used to carry the weight. There is a cam-actuated device for clamping the arm to the column, this being operated by a conveniently located lever on the head.

The machine is motor driven, the motor being connected to the drive shaft of the speed box by means of a Grundy flexible coupling. The box is located between the motor and the spindle head. The motor bracket is adjustable to suit the different motors which may be used. Tapping may be performed on this machine by the use of a reversing motor provided with magnetic brake and control. Eight spindle speeds and six feeds are available. The speeds are selected by two interlocking levers, by which only one set of gears can be shifted at a time. The sliding gear system is used to change speeds.

The spindle head has long and narrow guides and is moved along the ways of the arm by means of an angular rack, worm and hand wheel. The head may be clamped to the arm in any position. Thrust of the spindle is taken on ball bearings. The spindle is driven by a hardened steel worm and bronze worm wheel, the worm being connected to the speed-box by a shaft having a continuous keyway on which the worm slides. The spindle proper has a double keyway on which is mounted one member of a hardened steel jaw clutch, which meshes with the other clutch member secured to the worm wheel. The clutch member on the spindle is shifted by means of bronze shifter shoes with operating level located in front of the operator. The drill spindle is arranged to travel in the center of the vertical arm so that drilling pressure is equally distributed and twisting strains are minimized.

The drive to the feed box, which is a self-contained unit, is taken from the main spindle through spur gears. The drive pinion is of steel, runs in a bronze bearing and is held in place by means of thrust washers. The driving gear is of cast iron and is directly connected to the feed box mechanism. The pinion and gear are entirely inclosed, but are accessible. All gears are of hardened steel and dive key construction is used. Changes of feed are made by means of a graduated dial showing the various feeds obtainable.

The feed to the drill spindle is obtained through a worm, worm wheel, rack and pinion. A large friction clutch of the multiple disk type is used for engaging the power feed. The clutch is engaged and dis-



Boiler and Fire Box Drill Especially Adapted for Drilling Broken Staybolts and Retapping and Setting Staybolts

engaged by two handles of the pilot wheel. A handwheel on the worm shaft permits of feeding by hand. The spindle of the machine can be moved 20 in. vertically. The maximum distance from the center of the column to center of spindle is 85 in., and the minimum, 20 in. The greatest distance from the floor to the spindle nose is 55 in. The net weight of the machine is approximately 7200 lb.

Poor Year for the Virginia Iron, Coal & Coke Co.

The Virginia Iron, Coal & Coke Co. reports a deficit for 1924 of $53,504, after charges. This compares with net income of $456,665 in 1923, when $2.06 per share was earned on $10,000,000 common stock. Its furnace showed a loss of $72,364 against a loss of $105,199 in 1923, while coal mines earned $252,766 last year. Coke operations showed a loss of $12,180, compared with earnings of $142,439 in 1923. Total income was $350,103, considerably less than half of that in 1923. After allowing for dividends there was a deficit of $303,379 against one of $143,145 in 1923 and surplus of $325,583 in 1922. To quote:

"On account of market conditions prevailing throughout the year, prices on coal were so near the cost of production that the profit was necessarily very scant, this condition being brought about by over production. However, mines were operated at about 65 per cent throughout the year.

"The condition in the pig iron market was very similar, in that the management did not feel justified in running but one furnace out of six, and that furnace for only five months during the year. The company's mines are in condition to produce more coal than ever before in its history and the equipment is in good condition. The cost of coal production has been substantially reduced."

Continental European Markets Better

France and Germany Not Yet Agreed—German Steel Quotas 85 Per Cent for March—Belgian Sheets Strong—Situation in England Discouraging

(By Cablegram)

LONDON, ENGLAND, Feb. 23.

WEAKNESS continues in pig iron. Business is slow generally, though one or two fair lines of Cleveland grades have been sold to the Continent, but domestic consumers are well stocked. Hematite is dull and prices are easier.

Wales has bought 100,000 tons of Spanish ore; otherwise, foreign ore is quiet. Bilbao Rubio is held nominally at 22s. 3d. to 22s. 6d. ($5.30 to $5.36) c.i.f. Tees.

Finished steel is dull. Little business of an important nature is moving. There is some export inquiry, but orders are not coming in. Vickers has tendered a proposal for the construction of two Australian cruisers. Baldwin's, Ltd., has formed a subsidiary in Johannesburg in connection with its South African organization.

Sheets and Tin Plate

There is an improved demand for tin plate, with considerable business. Some makers are now fully sold on a restricted rate of output to the middle of May. Export demand, particularly from Continental sources, is quite good. The makers' and merchants' committee meeting last week agreed to allow all merchants 1½ per cent commission on all business, subject to the stabilization scheme. The conditions are that domestic consumers are to have ½ per cent of the 1½ per cent. Baldwin's, Ltd., and the Anglo-Saxon Petroleum Co. are interested jointly in the project to erect new tin plate mills in Wales, to provide all requirements of the latter concern. The company is now registered, being called the Glamorgan Tin Plate Co., with a capital of £200,000.

Galvanized sheets are weak, on poor sales.

Black sheets are dull. Japanese specifications have been reduced 30s.; 6 x 3 ft., 13's, 107 lb., being now £16 10s. (3.51c. per lb.) f.o.b.

On the Continent of Europe

Continental markets are uncertain. There is some fair demand, but general business is not passing through London houses. The works are reported well placed, but occasionally cheap sellers appear. Merchant bars are being sold at £5 16s. (1.23c. per lb.) f.o.b.; joists (beams) at £5 11s. (1.18c.) f.o.b.; sheet bars have been done at £5 9s. ($25.94) f.o.b.

The German Raw Steel Trust has decided to operate during March at 85 per cent of capacity, compared with 90 per cent in January and February.

IMPROVEMENT IN GERMANY

Iron and Steel Situation Slowly Develops—Controversy Regarding French Commercial Agreement Continues

BERLIN, GERMANY, Feb. 9.—The business situation is improving. The last unemployment return shows a slight increase, but this is due to seasonal causes, and the Prussian Trade Ministry's report for Feb. 1 shows in general markedly increased industrial activity. The heavy iron and steel branches, however, are quieter than a fortnight ago. This is partly a reaction after the sudden revival at the close of 1924; partly it is due to the protraction of the commercial treaty negotiations in Paris, from which great things were expected.

Dr. Bruno Bruhn of Essen, a member of the German experts' commission for the Paris negotiations, has published a statement which is worth summarizing. He confirms the agreement, described from here a fortnight ago, between the heavy iron producers and the manufacturing iron consumers, and claims that the

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British and Continental prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.76 per £1, as follows:

Durham coke, del'd	£1	4s.				$5.71	
Bilbao Rubio ore†	1	4				5.71	
Cleveland No. 1 fdy.	4	3½				19.87	
Cleveland No. 3 fdy.	3	18½				18.68	
Cleveland No. 4 fdy.	3	17½				18.44	
Cleveland No. 4 forge	3	17				18.32	
Cleveland basic	4	0				19.04	
East Coast mixed	4	6				20.47	
East Coast hematite	4	19	to £5	0s.		23.56	to $23.80
Ferromanganese	15	0	to 15	10		71.40	to 73.78
*Ferromanganese	15	0	to 15	10		71.40	to 73.78
Rails, 60 lb. and up	8	10	to 9	0		40.46	to 42.84
Billets	7	5	to 8	0		34.51	to 38.08
Sheet and tin plate bars, Welsh	8	4				39.03	
Tin plates, base box	1	3				5.47	
						C. per Lb.	
Ship plates	9	0	to 9	10		1.91	to 2.02
Boiler plates	13	0	to 13	10		2.76	to 2.87
Tees	8	17½	to 9	7½		1.89	to 1.99
Channels	8	2½	to 8	12½		1.73	to 1.83
Beams	7	17½	to 8	7½		1.67	to 1.78
Round bars, ¾ to 3 in.	9	2½	to 9	12½		1.94	to 2.04
Galv. sheets, 24 gage	16	15				3.56	
Black sheets, 24 gage	12	0	to 12	5		2.55	to 2.60
Black sheets, Japanese specifications	15	5				3.24	
Steel hoops	10	15	and 12	10*		2.28	and 2.66*
Cold rolled steel strip, 20 gage	16	0				3.40	

*Export price.
†Ex-ship, Tees, nominal.

Continental Prices, All F. O. B. Channel Ports

Foundry pig iron: (a)							
Belgium	£3	15s.				$17.85	
France	3	15				17.85	
Luxemburg	3	15				17.85	
Basic pig iron: (a)							
Belgium	3	14				17.61	
France	3	14				17.61	
Luxemburg	3	14				17.61	
Billets: (a)							
Belgium	5	7½	to £5	10s.		25.59	to $26.18
France	5	7½	to 5	10		25.59	to 26.18
Merchant bars:						C. per Lb.	
Belgium	5	17½				1.25	
Luxemburg	5	17½				1.25	
France	5	17½				1.25	
Joists (beams):							
Belgium	5	12½				1.20	
Luxemburg	5	12½				1.20	
France	5	12½				1.20	
Angles:							
Belgium	6	0	to 6	2½		1.28	to 1.30
⅛-in. plates:							
Belgium	7	2½				1.51	
Germany	7	2½				1.51	
⅞-in. ship plates:							
Luxemburg	7	2½				1.51	
Belgium	7	2½				1.51	

(a) Nominal.

former ought to get the increase in duties which they demand, on condition that the manufacturers are guaranteed cheap iron for production of export goods.

France and Germany Have Large Capacity

France has a large surplus production of pig iron and semi-finished material. Germany, despite her territorial loss, has so improved her methods and has built so many blast furnaces and open-hearth steel works that she has no need of imported iron, except possibly of certain sorts, and she will even have a surplus for export. That being so, she needs effective protection at home. The French Government is determined to keep alive the superfluous Alsace-Lorraine iron production, if necessary at cost of the taxpayer, and this must mean French dumping.

This prospect led to the plan that Germany, through the Pig Iron Syndicate, the new Raw Steel Syndicate or the Semi-Fnished Materials Syndicate, should contract to take a limited quantity of certain sorts of French iron at the current German home prices. The Germans, however, refused a French request that also a fixed quantity of Lorraine rolling-mill products should be taken. The Germans demanded as equivalent: (1) That the French minimum duties should be applied to German iron and steel finished goods; (2) that the Sarre question should be regulated in a way satisfactory to Germany; the Sarre district ought to be allowed to deliver goods to and take goods from both Germany and France duty free; (3) an agreement should be come to with the other European steel-exporting countries. A settlement with France in the above sense may yet be reached.

New Syndicates Forming

Combination in the home market continues. The Tubes Syndicate is practically formed; and negotiations are under way to include Czecho-Slovakian tube manufacturers, and perhaps Polish. It is desired to prevent the Czecho-Slovak concerns owned by Germans from competing. From South Germany has come the initiative to fuse the iron trading concerns. The new Semi-Finished Products Syndicate (Halfzeugverband) is waiting to see if certain outside concerns, chief of which is the Gutehoffnungshuette Co., will come in; if not, certain corporations may secede from the syndicate.

Large deliveries of Swedish ore, both for Westphalia and Upper Silesia, are under way. The consumption of Swedish ore beats even the record of wartime, being at the rate of about six million tons yearly against five million tons then. Smelters have in great measure got out of the habit of depending upon Lorraine minette, although its richness in phosphorus for agricultural use considerably reduces the net smelting cost. The Wabana ore contracts are stated not to have been renewed. Important contracts have been signed for Russian Krivoi Rog iron ore by the Charlottenburg firm of Rawack & Gruenfeld, also for Nikopol manganese ore, the Russian contractor being the "Yurt" Trust of Charkow, in South Russia.

Finished Steel Demand Less

With the exception of bars and thin sheets, the home demand has of late slackened; but the works have orders for a considerable time ahead and there is no sign of depression. Export trade is dull. There is a considerable home demand for pig iron; but the Pig Iron Syndicate has not changed its prices. A great improvement in the building market is expected from the Luther cabinet's plan to relax the housing and rent restrictions; and this would materially animate the home market for metal goods. Also, industrial construction is reviving, as a result of the American credits.

In the Solingen steel branch unemployment again is increasing, as a result of saturation of the home market. Export business is somewhat better. The *Frankfurter Zeitung* reports: "It is in general possible to sell to America only the best quality wares. Medium quality wares and mass-produced wares are difficult to sell." Solingen's exports to France, Belgium and Austria are very small; but business has improved with Japan, China and India, all of which take medium-quality or cheap wares. Prices for iron and steel finished goods have risen slightly. The increase in prices of machine tools at the New Year, however, had the effect of reducing volume of sales. The Daimler Motor Co. reports an improvement in home business, but export trade is far below pre-war level.

Prices Remain Quiescent

Prices of late have changed very little. The Semi-Finished Products Syndicate at its last session fixed blooms at 112½ [gold] marks per metric ton ($27.22 per gross ton), billets 120 m. ($29.04), and slabs 125 m. ($30.25), all ex-works. Actual market prices are somewhat higher, blooms being 115 m. ($27.83), billets 127 m. ($30.73), and slabs 132 m. ($31.94). Bars fetch 135 to 140 m. (1.46c. to 1.51c. per lb.), though for a short time they sold up to 145 m. (1.57c.), structural forms 130 to 133 m. (1.40c. to 1.44c.), thick sheets (over 5 mm., or No. 6½ gage) 147½ to 150 m. (1.59c. to 1.62c.); thin sheets (under 1 mm., or No. 25½ gage), 235 m. ($2.54c.). Scrap prices have receded, prime scrap being 77 m. ($18.63), steel scrap 80 m. ($19.36), turnings 62 m. ($15).

Negotiations between employers and employees concerning wages and working hours in the Ruhr coal industry having led to no result, an arbitral decision was taken. This fixed the normal shift for miners underground at 7 hr., to which for the present is added 1 hr.; the normal shift of mining employees above ground at 8 hr. plus 1 hr. extra; and the shift in other connected works with continuous operations at 10 hr.

The import prohibition on raw aluminum is being maintained in order, it is stated, to prevent American competition in the home market; but import licenses will be given where foreign prices or delivery conditions are more favorable than German. An import duty on raw aluminum is not proposed.

BELGIAN SHEETS IN DEMAND

Other Steel Products Not So Strong—Exchange Rate Continues to Harass Sellers

ANTWERP, BELGIUM, Feb. 4.—The market remained unchanged during the last fortnight. Great fluctuations of prices did not occur, though some weakness appeared for different commodities. The most important reasons are a growing shortage of orders and an accompanying resistance from the consumers, who abstain from buying, fully expecting still lower prices. Orders from India and China are totally absent. A few orders are reported from South America, also from North America, but in smaller amount.

Several big works are fully booked for two months to come, but other makers, to obtain new business, have to make concessions. So it results, especially for steel products, that prices are no longer so firm. The trend of this market is hesitating. Lorraine makers have about the same quotations and do their utmost to get a part of the not too plentiful orders. Luxemburg works, on the contrary, ask higher prices; they are fully committed with orders for Germany. The exchange rate is causing some disturbance on our markets.

F.o.b. Antwerp, £6, i.e., $28.80, was the nominal price for bars during these last two weeks. It appears, however, that notwithstanding offers have been made as low as £5 17s. 6d., a price such as £5 18s. 6d. is necessary, this, of course, for good quantities and favorable specifications. Business was also discussed and materialized at an equivalent of 540 to 550 fr., of course for export; locally, it appears from the following list, prices are still 20 to 25 fr. higher.

	Export		Domestic	
	Fr.	Per Lb.	Fr.	Per Lb.
Bars	550 or	$28.55 (1.30c.)	570 or	$29.60 (1.34c.)
Beams	520 or	27.00 (1.22c.)	540 or	28.05 (1.27c.)
Wire rods	660 or	34.30	680 or	35.30
Rods			670 or	34.80 (1.58c.)
Corrugated bars			615 or	31.95 (1.45c.)
Hoops			775 or	40.25 (1.83c.)
Cold-rolled hoops			1,100 or	57.60 (2.61c.)
Drawn steel squares			1,000 or	52.45 (2.39c.)
Drawn steel rounds			975 or	50.65 (2.30c.)
Drawn steel hexagons			1,075 or	55.85 (2.53c.)
Spring steel			1,050 or	54.56 (2.47c.)
Rails			700 or	36.35

Beams maintained their weak position. Prices were, for export, as low as 520 fr. and £5 10s. to £5 12s., according to the sections required. No more business than in previous weeks has been done in semi-finished materials. Prices remain as follows:

	Fr.
Thomas billets	510 or $26.50
Thomas blooms	490 or 25.45
Thomas sheet bars	520 or 27.00
Steel bands	700 or 36.35

Belgian works have only small quantities available. The exchange renders the export price still higher. In fact, with the rate of 92.50 fr. for £1, the above price turns out to about £5 10s. f.o.b. Antwerp for billets, when prices interesting English buyers would have to be no higher than £5 5s.

Sheets.—The market for sheets maintains the most favorable position among all steel commodities. Heavy material is well sought after and is quoted at £7 2s. 6d. f.o.b. Antwerp, i.e., $34.30 per ton, or 1.53c. per lb. Different big works no longer accept this price and keep to the Belgian quotation of 675 to 685 fr., which means $35.30 or 1.58c. Ruling prices are as follows (per ton of 2240 lb.):

	Fr.	Per Lb.
Thomas sheets 0.5 mm. (No. 25½ gage)	1,225	or $63.60 or 2.84c.
Thomas sheets 1 mm. (No. 19½ gage)	1,125	or 58.45 or 2.61c.
Thomas sheets 2 mm. (No. 14 gage)	850	or 44.15 or 1.97c.
Thomas sheets 3 mm. (No. 11½ gage)	750	or 38.95 or 1.74c.
Thomas sheets 5 mm. (No. 6½ gage)	680	or 35.30 or 1.58c.
Galvanized sheets 0.5 mm	2,300	or 119.50 or 5.34c.
Galvanized sheets 1 mm	1,750	or 90.90 or 4.06c.
Polished sheets, average price	1,600	or 83.10 or 3.71c.

As above francs prices indicate, the thinner materials seem somewhat weaker.

Pig Iron.—Foundry pig iron is expected to go higher. Last week's quotations have fallen 5 fr. per ton. The good demand, however, and the importance of orders booked will most probably make the price rise. Furthermore, French foundry iron has heavily advanced and certainly this will soon influence our prices. Phosphoric quality No. 3, with silicon 2.5 to 3 per cent, is quoted at 360 fr. f.o.b. Antwerp, i.e., $18.70, while Lorraine foundry pig iron, same grade, is already quoted 390 fr. ($20.25) and over. Luxemburg makers also quote higher, i.e., about 365 to 370 fr. ($18.96 to $19.22). Belgian semi-phosphoric foundry iron is not available for the moment. Thomas Continental basic pig iron is quoted at 340 to 350 fr. ($17.66 to $18.18.

The demand for coke is satisfactory. Price is unchanged at 145 fr. for half-washed furnace coke.

Some Signs of Improvement in Canadian Scrap Market

TORONTO, ONT., Feb. 23.—A stronger tone as regards demand has featured the Canadian iron and steel scrap market during the past week or ten days. Melters are showing more interest in requirements on spot account, and on some commodities dealers have found it necessary to go into the market to secure material to take care of business. Generally speaking, however, dealers are fairly well stocked with most lines of scrap. Both steel plants and foundries in Hamilton, Ont., are showing increased activities, which is resulting in greater scrap buying from this district. The Steel Co. of Canada, Ltd., is making good purchases of heavy melting steel turnings and flashings in addition to placing orders against old contracts. Other consumers in this district have also been making more extensive purchases of late, but mostly of a spot nature. Dealers' buying prices are as follows:

	Toronto	Montreal
Gross Tons		
Steel turnings	$11.00	$10.00
Machine shop turnings	11.00	9.00
Wrought pipe	7.00	8.00
No. 1 wrought scrap	13.00	13.00
Heavy melting steel	12.75	12.00
Steel axles	16.00	18.00
Axles, wrought iron	18.00	20.00
Net Tons		
Standard car wheels	16.00	16.00
Malleable scrap	14.00	16.00
Stove plate	14.00	13.00
No. 1 machinery cast	18.00	18.00

FRENCH IRON AND STEEL

Output in December Greater Than in November—During 1924 Greater Than in 1923

PARIS, FRANCE, Feb. 6.—On Jan. 1 there were 133 furnaces in blast as compared with 132 a month before. The output of pig iron in December was 665,326 metric tons, against 633,792 tons in November, and included 30,768 tons of forge iron, 134,404 tons of foundry iron, 4823 tons of Bessemer iron, 177,429 tons of basic iron and 17,902 tons of special kinds of iron.

The French output of steel in December reached 605,122 tons, compared with 557,937 tons in November, and included 8062 tons of acid Bessemer, 400,323 tons of basic Bessemer, 189,440 tons of open-hearth steel, 1069 tons of crucible steel and 6228 tons of steel made or finished in the electric furnace. The ingot output was 590,227 tons, and that of castings 14,895 tons.

The share of reannexed Lorraine in December was 255,028 tons of pig iron (244,409 tons in November) and 208,783 tons of raw steel (198,642 tons in November).

Production of the Year 1924

During the whole year 1924 the output of pig iron was 7,656,939 tons, against 5,299,581 tons in 1923, and included 398,808 tons of forge iron (340,360 tons in 1923), 1,565,127 tons of foundry iron (1,156,571), 42,584 tons of Bessemer iron (23,090), 5,469,744 tons of basic iron (3,580,384), and 180,676 tons of special kinds of iron (199,176).

French output of steel in 1924 reached 6,906,502 tons, compared with 4,976,869 tons in 1923, and included 85,199 tons of acid Bessemer (95,989 tons in 1923), 4,497,020 tons of basic Bessemer (2,922,345), 2,241,728 tons of open-hearth steel (1,896,850), 12,575 tons of crucible steel (13,514) and 69,980 tons of steel made or finished in the electric furnace (48,171). The ingot output was 6,740,962 tons and that of castings 164,908 tons.

Comparison with 1913

It may be interesting to compare the present output of pig iron and steel to that of pre-war. If in the above figures we allow for the production of Alsace-Lorraine, 2,980,344 tons of pig iron last year, France, in its pre-war boundaries, has produced in 1924 4,676,595 tons, against 3,432,417 tons in 1923. In 1913 the French production was 5,311,000 tons; the plants in the devastated areas have still to make up for an output of 600,000 to 650,000 tons.

French production of steel in 1913 was 4,635,166 tons. The production of Lorraine last year was 2,364,812 tons on the total figure of 6,906,502 tons. Consequently, the production of the pre-war territories, last year, was 4,541,690 tons (against 3,400,818 tons in 1923); within a little less than 100,000 tons, France has almost reached her normal output again.

Trade Statistics of the Main Iron and Steel Products in 1924

Iron Ore.—Imports, 667,041 tons; exports, 12,283,817 tons, including 7,743,758 tons to Belgium and Luxemburg, 2,509,461 tons to the Saare, 1,196,431 tons to Germany and 679,067 tons to Great Britain.

Pig Iron.—Imports, 42,485 tons; exports, 766,793 tons, including 21,606 tons to the United States.

Rolled Irons and Steels.—(Blooms, billets and bars, etc.). Imports, 250,847 tons; exports, 1,310,851 tons, including 4276 tons to the United States.

Wire Rods.—Imports, 38,979 tons; exports, 76,792 tons.

Hot and Cold Rolled Hoops.—Imports, 48,277 tons; exports, 10,055 tons.

Plates and Sheets.—Imports, 145,224 tons; exports, 59,006 tons.

Rails.—Imports, 7611 tons; exports, 291,639 tons, including 6275 tons to the United States.

Iron and Steel Pipes.—Imports, 27,915 tons; exports, 19,016 tons.

EXPORT BUSINESS FAIR

Japan Inquires for Rails and Pipe—Low Rail Prices in Japan—The Ford Rail Purchase

NEW YORK, Feb. 24.—Far Eastern business is still largely contributed by official rather than merchant buying. Chinese buyers show interest in second hand material of all grades, but wire shorts are quiet. Small lots of copper have been booked for China recently. Japanese municipalities and the railroads and large corporations are providing most of the inquiry at present. Purchases of machine-tools by Chinese and Japanese users have been small, but Germany has lately been a rather active purchaser of automatic machines and tools of special type, most of which are not built in Germany.

Importation of steel and pig iron into the United States continues to compete for prominence in international trade with the export business. In addition to the usual business, American contractors are occasionally being interested in foreign construction projects. One such is the building of a water supply system for the City of Athens, Greece, the contract for which will probably be awarded to a large American company, which has been prominent in foreign construction projects for a number of years.

Inquiries now pending from Japanese sources show the preponderance of railroad business that has been usual in the past few months. While some of the business in rails has been placed in Europe recently, prices as low as $35 a ton being quoted by the Imperial Steel Works in Japan will probably result in the award of the 11 miles of 75-lb. rails for which the Nankai Electric Railway of Osaka is in the market to the Japanese government mill. That American mills are still able to secure rail business in Japan is evident from the recent award by Tokio municipality of 7 miles of 85-lb. high T rails and 1½ miles of grooved rails to Takata & Co., New York.

Some inquiry for structural material has developed lately from Japanese consumers and the Imperial Government Railways has awarded 810 tons of large beams to the Bethlehem Steel Co. Another recent inquiry for structural steel, totaling about 3000 tons, has not been placed. The South Manchuria Railway Co. is receiving bids on 350 tons of tie plates and will open bids March 10 on two sets of 22 units of Pacific type condenser tubes and two sets of 32 units of Mikado type condenser tubes.

One of the large inquiries from Japan pending at present is from the Nippon Oil Co. for about 3000 tons of 6¼ to 8¼-in. oil country pipe. Export quotations of American mills continue largely unchanged. Light gage black sheets, which recently settled to a level of $94 to $95 a ton, c.i.f. Japan, are inactive. Tin plate, which advanced a few weeks ago with the rise in the exchange value of the pound sterling, has been reduced concurrent with a British drop in price of 6d per base box, being quoted at $6.15 to $6.17 per base box, c.i.f., Japan.

The Ford Rail Purchase

Although importers are still making highly interesting offers of Continental rails to the American railroads there seems little or no prospect of any change in the practice of purchasing from American mills, the case of the Duluth, Toledo & Ironton being unusual. This railroad, understood to be negotiating for a further tonnage of Continental rails, made its first contract with an importer in February of 1924, accepting a sample shipment of 500 tons of Bessemer rails rolled to A. S. C. E. and A. S. T. M. specifications. After tests under service conditions, an order was placed for 3000 tons, which were also taken largely on trial. The recent award, which received so much publicity at the time of purchase, was of 8500 tons. Thus a total of about 12,000 tons of 90-lb. sections was bought by the Ford railroad, being placed with the L. B. Foster Co., New York, representatives of the Providence Works, Belgium. The price is understood to have been about $40 per ton, delivered Detroit, which included an ocean freight of $3.50 per ton and an inland freight in the United States of $6.27 per ton. There have been recent sales by importers of light sections of rails to industrial users and business of this type is expected by importers to continue for some time.

NATIONAL ENAMEL EARNINGS

Over Two Million Dollars Written Off Owing to Receivership of St. Louis Coke & Iron Co.

ST. LOUIS, Feb. 24.—The profit on operations for 1924 of the National Enameling & Stamping Co. amounted to $1,862,646.26, it is shown in the annual report to stockholders by George W. Neidringhaus, president. After deductions, the profit was $873,982.

The complete earning statement for the year ended Dec. 31, 1924, follows:

Profit on operations for the year before providing for depreciation		$1,862,646.26
Deduct:		
Amount transferred to reserve for depreciation	$936,698.31	
Interest on refunding first mortgage five per cent gold bonds	51,965.71	
		988,664.02
Profit for year		$873,982.24
Surplus, Jan. 1, 1924		9,310,704.80
		$10,184,687.04
Dividends declared and paid during year:		
Preferred stock at 7 per cent	$700,000.00	
Cost of preferred and common stocks of St. Louis Coke & Iron Co. written off account receivership of company	2,236,557.61	
		2,936,557.61
Surplus, Dec. 31, 1924		$7,248,129.43

The report says:

"The unsatisfactory business prevailing at the time of our last report continued during a great part of the year 1924, and it was only toward the end of that year that favorable results appeared. Nevertheless, the earnings during the year, after writing off almost $1,000,000 for depreciation, more than covered the preferred dividends declared and paid. The outlook for the present time is decidedly encouraging.

"During the past year expenditures on capital account have been negligible in amount, and consequently the company has materially improved its current position.

"During the year notes payable have been reduced by $1,950,000, and bonds to the amount of $208,000 have been redeemed. Inventories, which have been taken as usual at the lower of cost or market price, with allowance made for seconds or wasters, have been reduced over $1,000,000. At Dec. 31, 1924, the company had cash and accounts receivable more than equal to its entire current liabilities.

"Owing to the St. Louis Coke & Iron Co. having been placed in receivership on Sept. 8, 1924, it has been deemed advisable to write off out of surplus the cost of the stock of that company, leaving only an asset of the first mortgage bonds."

Production and Shipments of Steel Barrels

Production of steel barrels is reported by the Department of Commerce at 420,127 in January, compared with 413,785 in December and with 307,189 in January, 1924. Production for the current month is, with the exception of last October, the greatest in more than a year. There were shipped during the month 415,040 barrels. Stocks at end of the month were 59,277, compared with 54,190 at the beginning of the month. Unfilled orders at the end of the month were 1,374,247, a considerable drop from the 1,586,034 at the end of December, but otherwise much the largest for more than a year.

Iron and Steel Markets

AWAITING DEVELOPMENTS

Operations Well Maintained

Reports from Structural, Railroad and Automobile Fields—Pig Iron Quiet

Production of steel in the Pittsburgh area continues at 85 per cent of capacity and at Chicago at close to 100 per cent. As the West can absorb twice the output of the plants of that region, it is not so surprising that bookings, as, for example, bars, are in excess of three months' output, but that the East can maintain its pace when it is making 2½ to 3 times as much steel is indirect evidence of the steady flow of specifications on contracts. There is no evidence of stock accumulation except in jobbers' hands.

Generally, some inroads are being made on unfilled orders. Except in the case of producers making one class of steel, this is causing little concern. Early developments are expected to define the course of the market for the next few months.

In the East large mills have shown a willingness to enter forward business, while in the West neither producer nor consumer has moved much in this direction. In the one case, tonnage is sought to maintain satisfactory operation; in the other, the seller sees a good market ahead and the buyer a ready supply. It was chiefly in the East that prior to the advance early this month customers were given an opportunity to get under cover for the second quarter.

Expectations of a large share of railroad business this year are helped by the New York Central's exercising an option on 31,390 tons additional of rails, placed with the Illinois, Bethlehem, Inland, and Carnegie steel companies. About 40 locomotives were bought, the Baldwin company to build 20 for the St. Louis-San Francisco and 10 for the Denver & Rio Grande. Of 1800 cars ordered, 1600 were for the Rock Island. The Baltimore & Ohio divided 6000 tons of tie plates among Pittsburgh and Eastern makers.

Expansion in structural steel demand is indicated in reports of bookings calling for 40,000 tons. Over 15,000 tons of this is for the New York City transportation system. Fresh inquiries appeared for well over 35,000 tons, including 14,000 tons for the Philadelphia subway, but not counting a vehicular tunnel between Oakland and Alameda in California. A Chicago & Northwestern bridge will require 3000 tons and the McKinney Steel Co. is taking bids on some 5000 tons for mill buildings.

Automobile steel demand is looking upward, the Ford Motor Co., for example, being now on a 6-day against the recent 5-day-a-week schedule. Tractor companies are reported operating at the limit of capacity and makers of tillage tools have lately enjoyed largest outputs in several years.

Tentative pipe and tank work in the West includes 1400 tons at Loveland, Cal., 1500 tons in Utah, 5000 at Kansas City and 12,000 tons for 40 tanks for the Standard Oil Co. at Whiting, Ind.

Blue annealed sheets, though demand has been relatively heavy, can be obtained at a basis of 2.70c., Pittsburgh, for second quarter, the current market price. Orders for galvanized sheets of the lighter gages for early shipment have been sought at $2 a ton below the general market level.

The abandonment by bolt and nut manufacturers of the system of quoting delivered prices within certain zone limits and the return to the three basing points, Pittsburgh, Cleveland and Chicago, will be equivalent to an advance in prices if present discounts are adhered to, for, instead of absorbing freight to destination, the various manufacturers will merely equalize freights with their closest competitors.

The strength of the Chicago situation is reflected in an advance of bar iron from 2c. to 2.10c. One rail steel mill is booked for two months ahead on double turn operations. Mills are falling behind on deliveries of concrete reinforcing steel.

The pig iron market drags and in some districts increasing difficulty is experienced in maintaining prices. Importations from Germany, England and India the past week amounted to 13,000 tons. Agitation in regard to the anti-dumping provision of the tariff may result in a general investigation as to prices of foreign grades.

Active competition of cast iron pipe imported from France continues and interest has been added to the situation by the City of New York's considering foreign bids on 8000 to 9000 tons of water and gas pipe to be awarded next month.

The German Raw Steel Syndicate has decided to operate at 85 per cent of capacity in March, compared with 90 per cent in January and February.

For the fourth week in succession THE IRON AGE composite prices are unchanged, that for pig iron being $22.50 per ton and that for finished steel 2.546c. per lb. Both are lower than they were either one year ago or two years ago.

Pittsburgh

Some Evidence of Increasing Production—Other Features Not So Favorable

PITTSBURGH, Feb. 24.—The general Pittsburgh area still is producing ingots at about 85 per cent of capacity, or at about the same average as last week and a week before. While the Steel Corporation is fortified with a generous order book and has enough live business to sustain a high operating rate for several weeks, this condition does not appear to be general among the independent companies, several of which worked out orders with great rapidity in the past 60 days and some of which now need additional tonnage to escape the necessity of curtailment of production. These are bald facts of the situation.

On the other side of the picture is evidence of increasing consumption, this being notably the case with fabricated steel, in which there has been considerable quickening of interest with the approach of spring. Not only is new inquiry livelier than it has been in structural steel, but investors who placed their tonnages late last year now are beginning to ask about

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Feb. 24, 1925	Feb. 17, 1925	Jan. 27, 1925	Feb. 26, 1924
No. 2X, Philadelphia‡	$25.01	$25.01	$25.01	$24.26
No. 2 Valley Furnace†	22.00	22.00	22.50	23.00
No. 2, Southern, Cin'ti†	24.05	24.05	24.05	26.55
No. 2, Birmingham, Ala.†	20.00	20.00	20.00	22.50
No. 2 foundry, Chicago*	24.00	24.00	24.00	24.50
Basic, del'd, eastern Pa.	23.75	23.75	24.25	22.75
Basic, Valley furnace	22.00	22.00	22.00	22.00
Valley Bessemer del. P'gh.	24.26	24.26	24.76	25.26
Malleable, Chicago*	24.00	24.00	24.00	24.50
Malleable, Valley	22.00	22.00	22.50	23.00
Gray forge, Pittsburgh	23.26	23.26	23.76	23.76
L. S. charcoal, Chicago	29.04	29.04	29.04	29.15
Ferromanganese, furnace	115.00	115.00	115.00	107.50
Rails, Billets, Etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Bess. billets, Pittsburgh	37.00	37.00	37.00	40.00
O.-h. billets, Pittsburgh	38.00	38.00	38.00	40.00
O.-h. sheet bars, P'gh	38.00	38.00	39.00	42.50
Forging billets, base, P'gh.	42.50	42.50	42.50	45.00
O.-h. billets, Phila.	41.67	41.67	41.67	45.17
Wire rods, Pittsburgh	48.00	48.00	48.00	51.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	2.10	2.10	2.00	2.30
Light rails at mill	1.80	1.80	1.80	2.00
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.28	2.28	2.28	2.57
Iron bars, Chicago	**2.10**	2.00	2.00	2.40
Steel bars, Pittsburgh	2.10	2.10	2.10	2.40
Steel bars, Chicago	2.20	2.20	2.20	2.50
Steel bars, New York	2.44	2.44	2.44	2.74
Tank plates, Pittsburgh	2.00	2.00	2.00	2.40
Tank plates, Chicago	2.30	2.30	2.30	2.60
Tank plates, New York	2.34	2.34	2.34	2.64
Beams, Pittsburgh	2.10	2.10	2.10	2.50
Beams, Chicago	2.30	2.30	2.30	2.60
Beams, New York	2.44	2.44	2.44	2.74
Steel hoops, Pittsburgh	2.50	2.50	2.50	3.00

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire,	Feb. 24, 1925	Feb. 17, 1925	Jan. 27, 1925	Feb. 26, 1924
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh.	3.50	3.50	3.60	3.85
Sheets, black, No. 28, Chicago dist. mill	3.70	3.70	3.70	...
Sheets, galv., No. 28, P'gh.	4.75	4.75	4.75	5.00
Sheets, galv., No. 28, Chicago dist. mill	4.85	4.85	4.85	...
Sheets, blue, 9 & 10, P'gh.	2.70	2.70	2.70	3.00
Sheets, blue, 9 & 10, Chicago dist. mill	2.80	2.80	2.80	...
Wire nails, Pittsburgh	2.85	2.85	2.85	3.00
Wire nails, Chicago dist. mill	2.95	2.95	2.95	...
Plain wire, Pittsburgh	2.60	2.60	2.60	2.75
Plain wire, Chicago dist. mill	2.70	2.70	2.70	...
Barbed wire, galv., P'gh.	3.55	3.55	3.55	3.80
Barbed wire, galv., Chi-dist. mill	3.65	3.65	3.65	...
Tin plate, 100 lb. box, P'gh.	$5.50	$5.50	$5.50	$5.50
Old Material, Per Gross Ton:				
Carwheels, Chicago	*$19.00*	$19.50	$20.00	$21.00
Carwheels, Philadelphia	*19.00*	19.50	19.50	19.50
Heavy steel scrap, P'gh.	*18.50*	19.00	20.50	20.50
Heavy steel scrap, Phila.	*17.00*	17.50	18.50	17.50
Heavy steel scrap, Ch'go.	*17.75*	18.00	18.00	17.50
No. 1 cast, Pittsburgh	*19.00*	20.50	20.00	21.00
No. 1 cast, Philadelphia	*18.50*	19.00	19.50	19.50
No. 1 cast, Ch'go (net ton)	19.00	19.00	19.00	21.00
No. 1 RR. wrot. Phila.	20.00	20.00	20.50	21.00
No. 1 RR. wrot. Ch'go (net)	*16.00*	16.50	16.00	16.50
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$3.50	$3.50	$3.75	$4.15
Foundry coke, prompt	4.25	4.25	4.75	5.00
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	15.00	15.00	15.12½	13.25
Electrolytic copper, refinery	14.50	14.50	14.62½	12.87½
Zinc, St. Louis	7.55	7.55	7.62½	6.85
Zinc, New York	7.90	7.90	7.97½	7.20
Lead, St. Louis	*8.90*	9.12½	9.75	9.25
Lead, New York	*9.20*	9.40	10.00	9.25
Tin (Straits), New York	*57.00*	57.12½	57.25	55.00
Antimony (Asiatic), N. Y.	*18.50*	21.50	16.50	11.00

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

THE IRON AGE Composite Prices

Feb. 24, 1925, Finished Steel, 2.546c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets. These products constitute 88 per cent of the United States output of finished steel.

Feb. 17, 1925,	2.546c.
Jan. 27, 1925,	2.560c.
Feb. 26, 1924,	2.775c.
10-year pre-war average,	1.689c.

Feb. 24, 1925, Pig Iron, $22.50 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham.

Feb. 17, 1925,	$22.50
Jan. 27, 1925,	22.50
Feb. 26, 1924,	22.88
10-year pre-war average,	15.72

	High				Low		
	1923	1924	1925		1925	1924	1923
Finished Steel	2.824c., April 24	2.789c., Jan. 15	2.560c., Jan. 6		2.546c., Feb. 3	2.460c., Oct. 14	2.446c., Jan. 2
Pig Iron	$30.86, March 20	$22.88, Feb. 26	$22.50, Jan. 13		$22.25, Jan. 6	$19.21, Nov. 3	$20.77, Nov. 20

deliveries. It is believed that the automobile industry is on the point of making greater demands on the steel industry and in a general way it is figured that the next 30 days will see a considerable increase in the amount of steel actually going into consumption. So, while there is a fairly common expectation that production will decrease somewhat from the present average, it is figured that there soon will be a better balance between production and consumption and consequently a sounder condition than recently, when production palpably was running well ahead of the amount of steel going into actual use. In other words, the trade has partaken of a good meal and now must have a digestive period.

There is, of course, some irregularity in prices as is quite natural for the reason that some producers are better supplied with business than others, but there is no real weakness unless a willingness on the part of those who are not very well filled up to write additional orders at prices ruling before the recent advances can so be considered. The advance to 2.20c. base, Pittsburgh, on plates, shapes and bars has not gone over at all well and the last advance of $2 a ton in sheets has been rather ineffective, not only because much tonnage was entered at the former prices, but because buyers became liberally supplied in the large movement from the mills over the past 60 days. In sheets there is also the factor of numerous small mills anxious to keep going at as high a rate as possible.

In the primary materials the situation still is one of extreme dullness and no great firmness to prices. Seeing no prospect of being able to get materially higher prices for pig iron, the producers are disinclined to figure on their second quarter requirements of coke

and that market in turn is depressed on account of lack of demand. Still lower prices have been reached on scrap iron and steel, but the prices now prevailing are due to the fact that there is practically no consumer buying and dealers, having an eye to filling their empty yards, are not disposed to bid very eagerly for material coming upon the market. There is no doubt that if there was some consumer buying of importance, considerable difficulty would be encountered in supplying it, except at much higher prices, because the dealers are without stocks and producers of scrap seem unwilling to let go at today's valuation.

Pig Iron.—Trading still is extremely slow in this market and tangible evidence of a buying movement still is lacking. Melters seem to take the position that if they defer their second quarter purchases long enough they will be able to get them at lower prices than now are quoted and just now they are not giving the market anything of a test. Sales of all grades are of very small lots for early delivery and more foundry iron than steel making iron is moving. The only change in the quotations is in foundry iron, which is not quoted above $22, Valley furnace, for No. 2 grade by any of the producers. That seems to be as high as it is necessary for buyers to go for spot tonnages, and as it appears that some brokers are letting go of speculative purchases at $21.50, it now seems as if no trouble would be had in securing second quarter supplies at $22. This, however, is merely conjecture, since important buyers have yet to speak. Basic iron is easy at $22 and it is believed that a sizable tonnage would bring out concessions. Bessemer iron still is quotable at $22.50 to $23, but merchant producers who are actually making this grade, as distinct from those who have some on their yards, are indisposed to go below $23. The coke situation has considerable bearing on the present pig iron market, for pending the establishment of second quarter prices, neither the producers nor the consumers of pig iron know which way to turn. A buying movement in pig iron just now would weaken the position of the pig iron producers and strengthen the hands of the coke producers and possibly produce a price for coke not justified by the prices that might have to be accepted in the stimulation of a buying movement in iron.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.76 per gross ton:

Basic	$22.00
Bessemer	$22.50 to 23.00
Gray forge	21.50
No. 2 foundry	22.00
No. 3 foundry	21.50
Malleable	22.00 to 22.50
Low phosphorus, copper free	29.00

Ferroalloys.—Consumers are specifying well against contracts and there are some instances of deliveries being anticipated, but new buying still is limited. Occasional sales of small lots of ferromanganese for quick delivery are noted at full quotations for domestic and British material and there were at least three sales, each of about 100 tons, of German material, at $110, c.i.f. Baltimore, duty paid. Spiegeleisen appears to have settled to $33, furnace, for 20 per cent and $32 for 16 to 19 per cent material. New business in this alloy is light, but there is a good movement on old orders. Prices are given on page 659.

Semi-Finished Steel.—Some makers are talking $39 as the basis of second quarter sheet bar contracts, but no actual business of this sort has been done, presumably because the nonintegrated sheet makers desire a clearer line on second quarter sheet prospects than now is obtainable. For delivery over the remainder of the present quarter no great difficulty would be had in securing tonnages at $38 and there is one report that an even more attractive price was made by one maker anxious to round out a schedule. This quarter's demands upon the strip makers have not been sufficient to absorb all of the billets and slabs coming in on contracts and with a carryover in prospect, their second quarter requirements are likely to be curtailed to the extent of the surplus taken from this quarter into the next one. Wire rods are reported to be moving well at $48, Pittsburgh, or Cleveland. Open market activities in skelp are small. Makers of forging billets and blooms want $45, base, for second quarter tonnages, but $42.50 is said to be as high as users want to go. Prices are given on page 659.

Wire Products.—Manufacturers in this district are busy both in a productive and shipping way on the orders and specifications driven in by the advance in prices during the first week of the month. Shipments are running heavier than in January, and that month was a good one in point of deliveries. Heavier consumption, likely to develop in the next 30 days, is counted on to keep orders flowing in and the lines finding large use in the agricultural districts are expected to do especially well this year on account of the greatly improved credit situation among the farmers. Much of the tonnage now leaving the mills carries the November prices of $2.75, base, Pittsburgh or Cleveland, on nails and $2.50 on plain wire, considerable business taken at those bases not being specified until about the date of expiration of the contracts. Much business has been entered at an advance of $2 a ton over those levels, but as consumers and jobbers are well supplied for current requirements, they are not yet freely specifying on these contracts. Prices are given on page 658.

Tubular Goods.—Recent line pipe orders, supplemented by more tonnage in oil country goods, due to the improvement in the oil situation, have given pipe mills both a larger and a better rounded out operation. For some time the operation was a rather poor one from a mill standpoint, running very full in butt weld, but rather relatively low in lap welded pipe capacity. The local secondary market evidently is poor, since local jobbers are quoting carload lots at the mill base of 63 and 5 per cent off list and a quotation as low as 64 per cent off list is heard. Mills are not making quotations that permit such prices by jobbers and the explanation probably is found in the desire of the latter to maintain a tonnage status with their sources of supply by taking a loss on some tonnage rather than cut down their specifications. Actual consumption of pipe locally usually is light at this season and this year is no exception. The boiler tube situation still is described as fairly active, but competitive, with prices favorable to buyers. Discounts are given on page 658.

Hot-Rolled Flats.—The market still is rather slow as regards both new business and specifications, although in the latter direction there has been a slight betterment. The effort to establish the market on strips at 2.50c., base, plus the new card of extras dated Feb. 5, has not been entirely successful. A good many mills are holding at that price, but there is also one of 2.40c. Wide strips still are subject to competition from sheets and skelp. Prices are given on page 658.

Cold-Rolled Strips.—Makers here regard the regular market price as 4.15c., base, Pittsburgh, and contracts for this of the second quarter in not a few instances carry this price. On large tonnages, or those that are attractive from a rolling standpoint, however, it is admitted that 4c. has been and still can be done.

Bolts, Nuts and Rivets.—In announcing second quarter prices, late last week, bolt and nut makers continued present discounts, but abandoned the freight-allowed method of quotation, set up last December. Instead, they are quoting from three basing points, Pittsburgh, Cleveland and Chicago, prices being the same at these points. By the change buyers pay an advance equivalent to the freight from nearest shipping point, as the discounts now are f.o.b. one of these points plus freight to destination, where formerly the manufacturer paid the freight. It seems that the freight-allowed mode of selling did not find complete subscription by all makers and that it was objectionable to some jobbers, who lost much of the former advantage over the small lot buyers. Bolt and nut business has not been particularly good so far this year. Large rivets are firm at $2.60, base, on contracts, but on spot sales, particularly of size, the ruling price is $2.50, base. Prices and discounts are given on page 659.

Tin Plate.—The situation is an orderly one, with consumers well covered to July 1 by contracts and specifying steadily enough to keep this branch of the

industry operating at about 80 per cent of capacity. Independent companies have produced more heavily against future requirements than has the American Sheet & Tin Plate Co. Western units of the latter are running full, as it has little enough capacity to meet the requirements of that territory and the desire is to avoid freight absorption in shipping from Eastern plants. The price is unchanged so far as business for this half of the year is concerned.

Steel and Iron Bars.—In a large way, the 2.20c. price of steel bars still is untested, as large users were very thoroughly covered for the present quarter and prior to the advance early this month from 2.10c., base, Pittsburgh, a number of makers gave their customers ample opportunity to get under cover for much of their second quarter requirements at that price. Only in cases where additional tonnage is needed is it necessary for buyers to go to the higher figure and at present there are not many such cases. Iron bars are holding at recent prices, with the demand steady. Prices are given on page 658.

Structural Material.—There is a more cheerful feeling among fabricating companies. Inquiries have been more numerous in the past week or 10 days than they were previously and, in addition, investors who placed some big jobs late last year now are beginning to inquire as to when they can expect deliveries. Local shops had something of a gap in their bookings after the heavy orders of last November and December, but with the prospect of early building weather, the outlook now is for greater shop activity and incidentally of demands upon the structural mills. The present quotation of Pittsburgh mills of 2.20c., base, for large structural beams still is untested, since protections at lower levels were so liberal. Prices are given on page 658.

Plates.—Locally, the price of plates is 2.20c., base, Pittsburgh, but there is no real evidence that this price has been done on any considerable tonnage. This is not surprising, considering that a good many large users were covered liberally late last year and there was plenty of opportunity for buyers to get additional coverage prior to the advance the fore part of this month. There is still much competition for new business when it is of sizable proportions or otherwise attractive from a mill standpoint. Prices are given on page 658.

Sheets.—The situation still leaves something to be desired from both a business and price standpoint. A number of mills produced at a higher rate than was necessary in January and cut considerably into their backlogs of "live" business. Consumption has not yet increased to a point where consumers must have additional supplies and there is much seeking of business to provide a reasonably good rolling schedule. This is seen particularly in black sheets, although there also is shading in all other finishes to a less extent. Automobile body sheets are being pressed for sale and demands from that source still being somewhat limited, 4.60c., base, no longer is especially infrequent. It is figured, however, that not only the automotive industry, but all other consuming industries, will be heavier consumers within the next 30 days and that heavier consumption will help to correct the price situation, which has been produced not only by the failure of a number of mills to "nurse" their orders, but by the fact that a number of smaller producers have been anxious about maintaining full operations for their benefit upon producing costs. Prices are given on page 658.

Rails and Track Supplies.—There has been considerable quickening in the inquiry for track supplies with the approach of the rail laying season and the same reason is operative in larger standard rail specifications. The Baltimore & Ohio Railroad has divided an order for about 6000 tons of tie plates with Pittsburgh district and Eastern makers. Light rails are as dull as ever. Prices are given on page 658.

Cold-Finished Steel Bars and Shafting.—One local maker recently announced the continuance of the present base of 2.80c., Pittsburgh, for second quarter business and others have since followed. A very good demand is reported from jobbers, but consumptive requirements so far this year have fallen short of expectations and this probably was the dominant factor in the price for second quarter, because hot-rolled bars have moved up at least $2 a ton since the 2.80c. cold-finished bar price was named. With the automotive industry limbering up, makers are encouraged to expect larger demands from that source in the next 30 days.

Coke and Coal.—The coke market in this district has almost disappeared. Continued curtailment of operations of the beehive ovens has pretty well reduced production of coke to actual contract requirements, and since furnaces running on beehive oven coke are on reduced blast, the fuel consumption is very easily supplied from contract shipments. Only a small amount of spot coke is coming on the market, but an even smaller amount is required. Sales are possible only at the prices of a week ago. There is not much demand for spot foundry coke and in that grade also last week's prices prevail. There is no indication that the H. C. Frick Coke Co., the Steel Corporation subsidiary, has any intention of making any immediate change in its scale of wages, but because it has curtailed operations, the labor situation in the Connellsville district is easier and it is probable that before long there will again be two wage scales in that district, the Frick scale and an independent scale, the latter to be that which was in effect over the last half of last year. The coal market still suffers from an oversupply.

Old Materials.—The market here is quotable at a further decline of 50c. a ton on the open-hearth grades, but at the new levels there is a measure of firmness, due to the fact that some of the steel mills which have been holding up shipments are again open for them and dealers with short contracts at these points are offering $19 for heavy melting steel for prompt shipment. There have been sales to consumers at $18.50 and dealers claim purchases as low as $18. It is purely a dealers' market, as there is no consumer buying of any consequence; if one or more of the mills came into the market for a round tonnage the seller, unless given plenty of time to cover, might be embarrassed, since yard stocks are low and it is commented upon that producers of scrap are not free sellers at present prices, which are $2.50 to $3.50 a ton below the recent high points. Offerings of scrap by a local electrical manufacturing company for March delivery brought $18.25 for heavy melting steel, $17 for compressed sheets, $14.20 for machine shop turnings and $14.50 for borings; freight charges to nearest consuming points range from 53c. to $1.40 per ton and, in addition, a profit to the dealers is to be reckoned. Considerable difficulty lately has been experienced in moving cupola cast scrap, and on such sales as have been made $19.50 appears to be the top, while the best bid now current is $19.

We quote for delivery to consumers' mill in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

	Per Gross Ton	
Heavy melting steel	$18.50 to	$19.00
No. 1 cast, cupola size	19.00 to	19.50
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	20.50 to	21.00
Compressed sheet steel	17.50 to	18.00
Bundled sheets, sides and ends	16.50 to	17.00
Railroad knuckles and couplers	21.50 to	22.00
Railroad coil and leaf springs	21.00 to	21.50
Low phosphorus blooms and billet ends	24.00 to	24.50
Low phosphorus plate and other material	23.00 to	23.50
Railroad malleable	18.00 to	18.50
Steel car axles	21.50 to	22.00
Cast iron wheels	19.50 to	20.00
Rolled steel wheels	21.50 to	22.00
Machine shop turnings	15.00 to	15.50
Short shoveling turnings	15.00 to	15.50
Sheet bar crops	20.00 to	20.50
Heavy steel axle turnings	18.00 to	18.50
Short mixed borings and turnings	15.00 to	15.50
Heavy breakable cast	17.00 to	17.50
Stove plate	16.00 to	16.50
Cast iron borings	15.00 to	15.50
No. 1 railroad wrought	15.00 to	15.50
No. 2 railroad wrought	18.50 to	19.00

Chicago

Railroad Buying a Leading Factor—Greater Demand for Shapes

CHICAGO, Feb. 24.—Second quarter buying of finished steel has not yet got under way, although some tonnage has been placed for that delivery, principally by the smaller users. Meanwhile most large buyers prefer to await developments. Of course, some tonnage now on mill books will overlap into second quarter and this is particularly true of soft steel bars, for which local mills have commitments which will carry them deep into May. In fact, Chicago producers of the heavier rolled products are still in a favorable position with output at 100 per cent of ingot capacity and specifications in excess of production. It is to be noted, however, that releases no longer exceed shipments to such an extent as earlier in the year, although among the individual producers exception must be taken for bars, specifications for which are considerably heavier than they were during January.

After several weeks of quiet in the fabricating field, awards and fresh inquiries for structural work are heavy, suggesting a revival of construction activity as spring approaches. Railroad buying is also in greater volume. The Rock Island Lines have placed 1600 cars and the Southern Pacific 400, while the New York Central has exercised options on 31,000 tons of rails. Few car inquiries are pending.

Developments in these and other heavy consuming lines will have much to do with the future course of the market. In fact, it is conceded that the new level of prices will get its real test some time between now and the middle of March. A prolonged continuance of the present low rate of buying is the one contingency which producers fear. Price changes during the week were of minor importance. An advance in bar iron to 2.10c., Chicago, removed one of the last weak spots in the market. A reinstatement of Chicago, Cleveland and Pittsburgh basing on bolts and nuts marks the end of the zone delivered price system after a brief trial.

Ferroalloys.—We note two carlot sales of spiegeleisen at $33, Eastern furnace, or $41.58, delivered.

We quote 80 per cent ferromanganese, $122.56, delivered; 50 per cent ferrosilicon for 1925 delivery, $85, delivered; spiegeleisen, 18 to 22 per cent, $41.58, delivered.

Pig Iron.—In a market of sustained quiet there have been no new developments which may safely be regarded as significant. Requests to hold up shipments are more numerous, but nevertheless deliveries of both pig iron and coke are still as heavy as during January. Although the situation among foundries is extremely spotty, it does not appear that melters are accumulating stocks to any appreciable extent. Manufacturers of sanitary ware and plumbing goods are running full, steel castings plants are producing heavily, while the melt among the general run of gray iron and malleable shops runs all the way from poor to good. Many melters, regardless of their present rate of operations, have not yet accumulated much second quarter business, and this no doubt accounts, in part, for their failure to buy further tonnage for that period. The future course of the pig iron market, apparently, will depend to a considerable extent upon the volume of castings business which develops between now and April 1. Current sales are few. An Illinois melter bought 400 tons of malleable for first quarter at the market and a spot sale of 200 tons of foundry in Wisconsin also went at the regular price. Six hundred and fifty tons of charcoal, of which 500 tons represented one purchase, brought the full market quotation. A recent sale indicates that 14 to 16 per cent ferrosilicon is obtainable at as low as $45, delivered. An Indiana melter has bought 500 tons of resale Southern. The quotation of $25.18, delivered, on Southern iron for barge and rail delivery has been withdrawn.

Quotations on Northern foundry, high phosphorus malleable and basic iron are f.o.b. local furnaces and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yards:

Northern No. 2 foundry, sil. 1.75 to 2.25	$24.00
Northern No. 1 foundry, sil. 2.25 to 2.75	25.00
Malleable, not over 2.25 sil.	24.00
Basic	24.00
High phosphorus	24.00
Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	29.04
Southern No. 2 (barge and rail)	25.68
Southern No. 2, sil. 1.75 to 2.25	26.51 to 27.01
Low phos., sil. 1 to 2 per cent, copper free	33.29 to 33.79
Silvery, sil. 8 per cent	35.29
Electric ferrosilicon, 14 to 16 per cent	45.00 to 47.42

Plates.—The Southern Pacific has placed 400 ballast cars with the American Car & Foundry Co., and the steel required, 4000 tons, will be furnished by the leading local mill. Fresh car buying is light, but steel producers are receiving heavy specifications against equipment contracts previously closed. Demand for tanks for storing crude oil has declined sharply, but the building of small tanks for refineries is still in full swing. A tentative program of the Standard Oil Co. for its Whiting, Ind., plant calls for the construction of 40 tanks, requiring 12,000 tons of plates. A pipe line at Loveland, Colo., will call for 1400 tons of riveted plate work; a pipe line and power house at Whellon, Utah, will require 1500 tons of steel.

The mill quotation is 2.30c., Chicago. Jobbers quote 3.10c. for plates out of stock.

Sheets.—Local mills are booked 40 to 45 days ahead and are now commencing to canvass the market for second quarter business. Some fresh orders have been taken at the new prices, although on black outside mills are still naming the old quotations. The tendency toward weakness, however, seems to be disappearing in this district, although still noticeable in the Southwest. It is generally conceded that the market will undergo the acid test within the next few weeks.

Chicago delivered prices from mill are 3.75c. to 3.85c. for No. 28 black, 2.85c. to 2.95c. for No. 10 blue annealed, 4.90c. to 5c. for No. 28 galvanized. Delivered prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than the Chicago delivered prices.

Jobbers quote f.o.b. Chicago: 3.80c. base for blue annealed, 4.50c. base for black, and 5.50c. base for galvanized.

Bars.—Soft steel bar specifications have shown a marked gain over those of January, although releases for that month were heavy. Smaller buyers are commencing to place orders for their requirements at the new prices, although the larger consumers are still awaiting developments. We note, however, a sale of 2000 tons of bars, plates and shapes at 2.20c., Chicago, for bars, and 2.30c. for the plates and shapes. Present bar bookings for local mills are very heavy, being estimated at 90 days or better. Among the secondary lines tractor plants are operating at the limit of their capacity. The situation in tillage tools is not so encouraging, although one producer reports the largest output in the three months ended Jan. 1 since 1920. Pressure on the mills for shipments of reinforcing bars is so heavy that they are falling behind on their deliveries. Bolt, nut and rivet plants are also specifying heavily. Bar iron demand is gradually gaining, and the price of 2c., Chicago, has now disappeared, all producers holding to a minimum of 2.10c. Rail steel bar business is also improving, and one important mill is booked for two months ahead on a double turn basis.

Mill prices are: Mild steel bars, 2.20c.; common bar iron, 2.10c., Chicago; rail steel, 2.10c., Chicago mill.

Jobbers quote 3c. for steel bars out of warehouse. The warehouse quotations on cold-rolled steel bars and shafting are 3.80c. for rounds and 4.30c. for flats, squares and hexagons; 4.15c. for hoops and 3.65c. for bands.

Jobbers quote hard and medium deformed steel bars at 2.70c.

Rails and Track Supplies.—The New York Central, which placed 184,650 tons of rails last October, has exercised its option on 31,390 tons additional, distributed approximately as follows: 12,000 tons to Illinois

Steel Co., 13,635 tons to Bethlehem Steel Co., 2865 tons to Inland Steel Co. and 2890 tons to Carnegie Steel Co. The Illinois Steel Co. also booked 1200 tons of angle bars from that road. The Belt Railway of Chicago has placed 1400 tons of rails with the Gary mill. All of the railroads are specifying very freely against their rail and fastening contracts; in fact, they want rail deliveries faster than the mills can make them.

Standard Bessemer and open-hearth rails, $43; light rails, rolled from billets, 1.90c. to 2c., f.o.b. makers' mill.

Standard railroad spikes, 3c. mill; track bolts with square nuts, 4c. mill; steel tie plates, 2.45c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.55c. base, and track bolts, 4.45c. base.

Cast Iron Pipe.—James B. Clow & Sons has booked 2000 tons for Duluth, Minn., 800 tons for Toledo, and 172 tons for Newcastle, Ind. St. Paul, Minn., has awarded 850 tons to the Lynchburg Foundry Co. The market appears to be growing quieter, and while there is a considerable volume of small business, aggregate bookings are not considered normal. Pending business includes:

Highland, Ill., 500 tons, bids taken Feb. 21.

New London, Wis., 125 tons of 6 and 8-in., March 3.

Two Rivers, Wis., 115 tons, March 2.

Cambria, Wis., 300 tons, Feb. 27.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $54.20; 6-in. and over, $50.20; Class A and gas pipe, $4 extra.

Bolts and Nuts.—The zone system of selling bolts and nuts has been abandoned, and the former plan of having three bases, Pittsburgh, Cleveland and Chicago, with identical quotations, has been reinstated. Specifications for bolts and nuts are fairly heavy, although they are falling a little behind current production.

Jobbers quote structural rivets, 3.50c.; boiler rivets, 3.70c.; machine bolts up to ⅝ x 4 in., 55 per cent off; larger sizes, 55 off; carriage bolts up to ⅝ x 4 in., 50 off; larger sizes, 50 off; hot pressed nuts, squares, tapped or blank, $3.50 off; hot pressed nuts, hexagons, tapped or blank, $4 off; coach or lag screws, 60 per cent off.

Structural Material.—Fabricating awards aggregate 12,190 tons, and seven of the lettings of the week exceeded 1000 tons each. New inquiries are numerous. Bridge work for the Chicago & North Western at Milwaukee will require 3000 tons. Contemplated additions to the works of the Inland Steel Co. and the Youngstown Sheet & Tube Co., at Indiana Harbor, Ind., will each require several thousand tons, if they go ahead. The Inland Steel Co. placed a contract for a blast furnace two weeks ago, as reported in THE IRON AGE. Other improvements under consideration but not yet definitely decided upon include a blooming mill, a power house and additional coke ovens. Local mills are booked 60 days ahead on plain material.

The mill quotation on plain material is 2.30c., Chicago. Jobbers quote 3.10c. for plain material out of warehouse.

Wire Products.—A limited amount of business has been taken at the new prices, and meanwhile specifications are liberal, though not so heavy as immediately following the recent advances. A continuance of specifications at that high rate, however, was hardly to be expected. Mills are not yet falling behind on deliveries, but this is due to the fact that they have not disposed of all of their accumulated stocks. There is an increased demand for bolts and spikes for narrow-gage mining railroads. For mill prices see page 658.

Hot-Rolled Strip.—Although the general quotation on this commodity is 2.60c., Chicago, that price has been shaded to the extent of $1 a ton.

Reinforcing Bars.—Lettings are less numerous, but little significance is attached to that fact, in view of the large amount of pending work. The steel for three public school buildings, in this city, has been awarded and general contract bids on three additional schools have been taken. Reinforcing bars are quoted at 2.70c., Chicago warehouse.

Lettings include:

Public school, Sixtieth and Rockwell Streets, Chicago, 150 tons, to Concrete Engineering Co.

Public school, Seventieth Street and Merrill Avenue, Chicago, 175 tons, to Concrete Steel Co.

Public school, Forty-Eighth Street and Karlov Avenue, Chicago, 164 tons, to Concrete Steel Co.

Century building, Milwaukee, 250 tons, to Worden-Allen Co.

Grade separation, Spring Wells, Mich., 100 tons, to Bourne Fuller Co.

National Lock Co., plant, Rockford, Ill., 700 tons, to American System of Reinforcing.

Pending work includes:

Augustana Hospital, Chicago, 150 tons, M. J. Sturm, Chicago, architect.

Crowley-Milner Department Store, addition, Detroit, 125 tons.

City Hall, Boscobel, Wis., 100 tons.

Coke.—Shipments of by-product foundry coke during February have been as heavy as during January. The running price is unchanged at $10.75, delivered Chicago switching district.

Old Material.—The stronger tendency in the market which developed a week ago lasted long enough to clinch the sale of 35,000 tons of heavy melting to a large independent mill at $18.50, delivered. This transaction had hardly been negotiated when evidences of weakness again made their appearance. Unquestionably the pronounced softness of other market centers throughout the country prevented any further gains in local prices, regardless of elements of strength in the Chicago situation. The quick reversal of the market has caused confusion, with the consequence that it is difficult to gage the exact level of prices, many of them being purely nominal. A number of declines are recorded below, however. The Burlington will take bids on 6000 tons Feb. 25.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	$19.50 to $20.00
Cast iron car wheels	19.00 to 19.50
Relaying rails, 56 and 60 lb.	25.00 to 26.00
Relaying rails, 65 lb. and heavier	26.00 to 31.00
Forged steel car wheels	21.00 to 21.50
Railroad tires, charging box size	21.50 to 22.50
Railroad leaf springs, cut apart	20.75 to 21.25
Rails for rolling	19.00 to 19.50
Steel rails, less than 3 ft.	20.00 to 20.50
Heavy melting steel	17.75 to 18.25
Frogs, switches and guards cut apart	18.00 to 18.50
Shoveling steel	17.50 to 18.00
Drop forge flashings	14.00 to 14.50
Hydraulic compressed sheets	15.00 to 15.50
Axle turnings	15.00 to 16.00
Steel angle bars	19.00 to 19.50
Steel knuckles and couplers	20.50 to 21.00
Coil springs	21.50 to 22.00
Low phos. punchings	19.50 to 20.00
Machine shop turnings	12.00 to 12.50
Cast borings	15.00 to 15.50
Short shoveling turnings	15.00 to 15.50
Railroad malleable	20.00 to 20.50
Agricultural malleable	19.00 to 19.50
Per Net Ton	
Iron angle and splice bars	20.00 to 20.50
Iron arch bars and transoms	21.00 to 21.50
Iron car axles	27.00 to 27.50
Steel car axles	19.00 to 19.50
No. 1 busheling	15.00 to 15.50
No. 2 busheling	11.50 to 12.00
Pipes and flues	12.50 to 13.00
No. 1 railroad wrought	16.00 to 16.50
No. 2 railroad wrought	14.00 to 14.50
No. 1 machinery cast	19.00 to 19.50
No. 1 railroad cast	17.50 to 18.00
No. 1 agricultural cast	17.50 to 18.00
Locomotive tires, smooth	18.00 to 18.50
Stove plate	15.00 to 15.50
Grate bars	15.00 to 15.50
Brake shoes	14.50 to 15.00

A small and compact reversing starter, designated as the CR-7009-M4, intended primarily for monorail hoist service but adapted for other applications, such as small motor-operated doors, has been developed by the General Electric Co., Schenectady. For monorail hoist or other intermittent duty, the starter may be used with a.c. or d.c. motors up to 5 hp. on voltages from 115 to 550. The size is 6 x 9 x 14 in.

The Universal Portland Cement Co. will soon commence the construction of a harbor and dock on Lake Michigan at its Buffington, Ind., plant. The new facilities will be used for handling and storing limestone, slag and coal and shipments of cement. Plans are also being prepared for an addition to the cement plant at Buffington.

New York

Increased Interest in Importing of Cast Iron Pipe—Pig Iron Dull

NEW YORK, Feb. 24.—A further stride of Continental cast iron pipe in competing with the domestic product seems imminent in the report that the City of New York is accepting foreign bids on the 8000 to 9000 tons of water and gas pipe opening March 15. Low bids are understood to have been submitted by a European maker of cast iron pipe on the 12,000 tons of 20-in. pipe for Oneida, N. Y. Lately the City of Newark placed 1600 tons of pipe ranging from 2-in. to 24-in. with a French producer. The New York & Richmond Gas Co., which has been in the market for a round tonnage for several weeks, has accepted foreign bids, but no award has been made. It is understood that the Pont-a-Mousson Works in France, practically the only European seller at present, is offering June delivery and estimates that from its total capacity it has about 100,000 tons annually available for American consumption. Importers say this is not a large enough tonnage to cause alarm among domestic companies. This maker exports pipe to South America, Africa and several Mediterranean countries.

Pig Iron.—Hesitation without keen interest expresses the attitude of nearly all melters of pig iron in the Metropolitan district. Last week sales amounted to only about 3000 tons, of which one firm sold 1500 tons and the remaining 1500 tons was divided among a number of sellers. The Central Foundry Co., which has been in the market for about 12,000 tons, belongs in the hesitation class. The explanation for the failure to buy is found in the feeling of foundrymen that nothing will be gained by acting at the present time. They have no fear of being unable to get all the iron they need and they think it possible that prices may recede. The only new inquiries of consequence are for 1000 to 2000 tons for foundry and malleable for second quarter from Connecticut and one for 6000 tons of foundry for the A. P. Smith Co. for third quarter. The preponderance of testimony is that melt is increasing moderately. The Replogle furnace which has been slated for action for some time will be blown in this week, probably Thursday.

We quote delivered in the New York district as follows, having added to furnace price $2.52 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia:

East. Pa. No. 2, sil. 1.75 to 2.25	$26.02
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	27.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	26.52
Buffalo, sil. 1.75 to 2.25	$26.91 to 27.91
No. 2 Virginia, sil. 1.75 to 2.25	29.44 to 30.44

Ferroalloys.—With the exception of one inquiry covering not less than 500 tons of ferromanganese the market is bare of anything but small lot business. In spiegeleisen both sales and inquiry are confined to small and carload lots, mostly by companies which are accustomed to buying only in small quantities as the need arises. Prices in both commodities are firm and unchanged.

Warehouse Business.—Aside from the lessening of mill competition and an advance in quotations on bolts and screws, the market is unchanged, prices standing firm through a period of moderate demand. Tool steel, shafting and screw stock, and reinforcing bars are good movers. Sheets have shown no recoil in demand from the recent advances, yet no great volume is moving. Cut thread machine bolts are now quoted at 40 and 10 per cent off list and wood screws at 72½, 25, 10 and 5 per cent off list. Prices are given on page 680.

Cast Iron Pipe.—Makers of water pipe are encountering continued competition from the Continental product. Less opposition to the acceptance of bids from sellers of Continental pipe is being encountered from municipalities. Greenburgh, N. Y., will open bids shortly on a contract involving the installation of about 1100 tons of 4-in., 6-in., 8-in. and 10-in. water pipe and it is understood that foreign bids are being accepted, which is also the case on the 8000 to 9000 tons of pipe ranging from 8-in. to 48-in. on which the Department of Water Supply, Gas and Electricity, New York, opens bids March 15. Domestic producers are endeavoring as far as possible to meet the competition of the imported product, so that quotation of the actual going market on cast iron pipe is difficult. Jobbers' stocks of soil pipe are apparently in a satisfactory state and current purchasing is confined to small lots. Discounts are unchanged.

We quote pressure pipe per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, $54.60 to $55.60; 4-in. and 5-in., $59.60 to $60.60; 3-in., $69.60 to $70.60, with $5 additional for Class A and gas pipe. Discounts on both Northern and Southern makers of soil pipe, f.o.b. New York, are as follows: 6-in., 40 to 41¼ per cent off list; heavy, 50 to 51¼ per cent off list.

Coke.—Weakness still pervades the market and prices have eased off further. Consumers still refuse to take the full amount of their contracts, hence coke awaiting movement is available at lower figures. On furnace grade, $3.50 has been done and foundry has changed hands at $4.25. Some operators have decided there is more profit in coal than coke. There is a mild movement of foundry coke, but most buyers persist in hand-to-mouth tactics. Meanwhile second quarter negotiations are in abeyance.

Old Material.—There is so little activity, except among dealers and brokers, that it is difficult to establish more than nominal prices on most grades. No. 1 heavy melting steel is being purchased at $16.50 per ton, delivered Bethlehem, Pa., and a fair range of the buying market is probably $16.50 to $17 a ton, delivered, although higher than $17 is reported to have been paid in some instances. Prices on forge fire are only to be considered as the probable buying price if shipments were going forward to the usual consumers. Stove plate is quiet with a local New Jersey consumer still out of the market. Specification pipe is being purchased by brokers at $16.50 a ton, delivered eastern Pennsylvania. Cast borings for steel works are quiet with buying prices nominally $10.50 to $11 a ton, New York, for eastern Pennsylvania shipment, while brokers with small orders at Scottsdale, N. J., are offering up to $14.50 a ton, with a freight rate of $1.90 a ton. Heavy breakable cast is worth from $16 to $17 a ton, delivered eastern Pennsylvania.

Buying prices per gross ton New York follow:

Heavy melting steel, yard	$12.50 to $13.00
Heavy melting steel, railroad or equivalent	13.50 to 14.00
Rails for rolling	15.00 to 15.50
Relaying rails, nominal	24.00 to 25.00
Steel car axles	20.00 to 20.50
Iron car axles	25.00 to 26.00
No. 1 railroad wrought	15.50 to 16.00
Forge fire	11.50 to 12.00
No. 1 yard wrought, long	14.00 to 14.50
Cast borings (steel mill)	10.50 to 11.00
Cast borings (chemical)	16.00 to 16.50
Machine shop turnings	11.00 to 11.50
Mixed borings and turnings	10.00 to 10.50
Iron and steel pipe (1 in. diam., not under 2 ft. long)	12.25 to 12.75
Stove plate	11.00 to 11.50
Locomotive grate bars	12.50 to 13.00
Malleable cast (railroad)	16.00 to 16.50
Cast iron car wheels	15.00 to 15.50
No. 1 heavy breakable cast	12.50 to 13.50

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast	$17.00 to $17.50
No. 1 heavy cast (columns, building materials, etc.), cupola size	15.00 to 15.50
No. 2 cast (radiators, cast boilers, etc.)	14.00 to 14.50

Finished Iron and Steel.—Mills which freely opened books for contracts in the last buying period are the ones enjoying activity today, as the fact remains that a remarkably high volume of specifications against these contracts continues. Mills which entered chiefly only specific orders are the ones running not quite so well or running with bookings sufficient for only a few weeks' operations. With the first group appearances are that the unfilled tonnage has actually increased, that operations if anything are on a larger scale and there is no diminution of the optimistic expectations for the next few months. We note an increased number of orders booked for steel bars at 2.20c., Pittsburgh basis, but also it is clear that the amount of steel that is covered for forward delivery at the 2.10c. basis

was not exaggerated in the report a week ago. In steel plates, the marked price is 2.10c., Pittsburgh, as a minimum, but with so little offering of an attractive nature to the steel mill the price is substantially untested. Steel building work looks promising, as indicated in the definite items reported in another column, and to these may be added a large building actively under consideration for Yale University, the Sterling Memorial Library. Little new light may be thrown on the trend, unless this, that the scattered orders going through at the new prices, for as prompt delivery as possible, are taken to indicate little accumulation of stock in many quarters.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, 2.44c. to 2.54c.; plates, 2.34c. to 2.44c.; structural shapes, 2.44c. to 2.54c.

Birmingham

Alabama Furnaces Adhere to Recent Quotations on Pig Iron

BIRMINGHAM, ALA., Feb. 24.—Alabama furnace interests are holding to the quotations of $22 for No. 1 foundry, with an occasional sale at $21.50, even going so far as to decline business at lower prices. The sales have not been numerous of late and the amount sold is not very great, but the officials of furnace companies appear to be satisfied there will be need for a large tonnage for second quarter requirements. The starting up again after relining and repairing of the No. 1 blast furnace of the Tennessee Coal, Iron & Railroad Co. at Ensley, adding 600 tons and more of basic iron to the daily make, brings the pig iron production to a maximum rate since the World War. The furnace at Ensley is again making basic, the total with the Tennessee now being six furnaces at Ensley, the Alice, (city), Oxmoor and one at Bessemer with two Bessemer blast furnaces producing foundry iron. Need of basic iron in quantity is anticipated when the new steel plant, which has four open-hearth furnaces, starts up in April.

We quote per gross ton, f.o.b. Birmingham district furnaces, as follows, the lower prices being for first quarter and the higher those of the largest producers for second quarter:

No. 2 foundry, 1.75 to 2.25 sil.	$21.50 to $22.00
No. 1 foundry, 2.25 to 2.75 sil.	22.00 to 22.50
Basic	21.00 to 22.00
Charcoal, warm blast	30.00

Steel.—Slight decrease in steel demand is noted in this district and the Gulf States Steel Co. has only four of its open-hearth furnaces in operation now. Steel Corporation operations show no changes. Shipments of steel are heavy by both Steel Corporation and independent. The new steel plant of Tennessee Coal, Iron & Railroad Co., with four open-hearth furnaces will be completed and placed in operation in April. Steel bars, soft, are quoted at 2.35c. to 2.40c., Birmingham.

Cast Iron Pipe.—Admission is heard to the effect that some piling up of orders has taken place as the spring buying of cast iron pressure pipe starts in earlier than heretofore. The quotations of pressure pipe show no change as yet, $40 base for 6-in. and over pipe. The selling into the second quarter has started and indications are that a large tonnage is going to be needed to fill demands.

Coke.—Demand for coke is requiring practically all of the product now being turned out here with more beehive coke ovens going than two months ago. The Alabama By-Products Corporation, the largest independent coke producer of the district, will have its additional 25 ovens in operation next month at the by-product plant at Tarrant City, making 100 ovens in all going. The Sloss-Sheffield Steel & Iron Co., the Yolande Coal & Coke Co. and the Black Creek Coal & Coke Co. are operating beehive ovens. Quotations for coke remain steady, around $5 and $5.50 per ton for the foundry product.

Old Material.—Weakness in the scrap iron and steel market here is reported, with very little selling. Delivery is active on old contracts. An encouraging incident in the old material market is an inquiry from the Tennessee Coal, Iron & Railroad Co. for certain articles in the scrap list, borings, turnings and steel crop ends. This is the first time the company has been on the open market. While no authoritative statement is made, it is understood that the scrap will be used in blast furnaces.

We quote per gross ton, f.o.b. Birmingham district yards, as follows:

Cast iron borings, chemical	$15.00 to $16.00
Heavy melting steel	15.00 to 16.00
Railroad wrought	14.00 to 15.00
Steel axles	18.00 to 19.00
Iron axles	19.00 to 20.00
Steel rails	15.00 to 16.00
No. 1 cast	17.00 to 17.50
Tramcar wheels	17.00 to 17.50
Car wheels	16.00 to 17.00
Stove plate	15.00 to 16.00
Machine shop turnings	8.00 to 9.00
Cast iron borings	8.00 to 9.00
Rails for rolling	15.50 to 16.50

Boston

Pig Iron Buying Has Dropped to Small Proportions in New England

BOSTON, Feb. 24.—Pig iron buying has dropped to small proportions, sales the past week being the smallest reported in a long time. Foundries, as a rule, are covered for nearby requirements, and realize prompt shipments of iron can be secured if necessity requires, and are disposed to wait lower prices. Domestic furnaces are not forcing sales. At the same time, foreign iron is offered freely. Buyers maintain $22.75 and $22.50, Buffalo base, can be done, but furnacemen say they are on a $23 base. One Buffalo furnace just turned down a 2,000-ton No. 2 plain iron order at slightly more than $22 furnace. Hardly enough eastern Pennsylvania iron is offered to make a market. Dutch and Continental, silicon 2.50 to 3, is offered at $23 on dock duty paid, and sales at that price are reported, at $23.50. Belgian furnaces have large pig iron export orders. Local receipts of foreign iron the past week were 2,500 tons of Dutch, bringing total arrivals for February to date up to 11,642 tons, and for the year to 19,854 tons.

We quote delivered prices on the basis of the latest reported sales as follows, having added $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia and $9.60 from Alabama:

East. Penn., sil. 1.75 to 2.25	$27.15 to $27.65
East. Penn., sil. 2.25 to 2.75	27.15 to 28.15
Buffalo, sil. 1.75 to 2.25	26.91 to 27.91
Buffalo, sil. 2.25 to 2.75	26.91 to 28.41
Virginia, sil. 1.75 to 2.25	29.92
Virginia, sil. 2.25 to 2.75	30.42
Alabama, sil. 1.75 to 2.25	31.10
Alabama, sil. 2.25 to 2.75	31.60

Coke.—The movement of by-product foundry coke from ovens to consumers has fallen off once more, and it is again a question whether February will make as good a showing as January. Some opposition to paying the advance of 50c. a ton, or $12 delivered, is found among foundries, as it is maintained raw material prices have tended upward, while competition for business is keener than ever and the sale price of castings is on the decline. By-product coke makers report a continued active demand for domestic fuel at prices that make foundry coke even at $12 ovens unattractive business. So great has been and is the demand for domestic coke that one oven interest has under consideration the enlargement of its plant.

Old Material.—Buying of old material is largely confined to the filling in of old orders, and to replacement of rejected material. Price adjustments on rejected material the past week have ranged from $1.50 to as high as $7 a ton. Yard interests are not disposed to sell material at prevailing prices, consequently most of the current buying is direct from industrial plants. Machine shop turnings to apply to old orders have been bought at $10.60 a ton on cars shipping point, but $10.50 is the best dealers will do on new business. The decline in heavy melting steel prices appears to have been arrested. Early in the past week, bundle

skeleton was bought at $10.60 on cars, but of late demand has dried up. Local brokers say sales in other territories are being made at $13.50 delivered, which means $9 on cars Boston.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$19.50 to $20.00
No. 2 machinery cast	17.00 to 18.00
Stove plates	15.00 to 15.50
Railroad malleable	19.00 to 20.00

The following prices are offered per gross ton lots, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$12.50 to $13.30
No. 1 railroad wrought	15.00 to 15.50
No. 1 yard wrought	14.00 to 14.50
Wrought pipe (1-in. in diam., over 2 ft. long)	12.50 to 13.00
Machine shop turnings	10.00 to 10.50
Cast iron borings, chemical	15.00 to 15.25
Cast iron borings, rolling mill	10.50 to 11.00
Blast furnace borings and turnings	9.00 to 9.50
Forge scrap	11.00 to 11.50
Bundled skeleton	11.00 to 11.50
Bundled cotton ties	8.50 to 9.00
Forged flashings	11.00 to 11.50
Shafting	19.00 to 19.50
Street car axles	19.00 to 19.50
Rails for rerolling	15.00 to 15.50
Scrap rails	12.50 to 13.00

St. Louis

Little Buying of Pig Iron—Old Material Prices Again Decline

ST. LOUIS, Feb. 24.—Buying of pig iron in the St. Louis district continues light. Melters are fairly busy, but the volume of new business has not been what they had expected and they are holding off as long as possible to place orders for second quarter requirements, the size of which they have no idea at present. The belief that prices may be reduced is a factor in the situation. The St. Louis Coke & Iron Co. received the only orders of consequence; 2500 tons of wheel iron for an East Side manufacturer and 1000 tons of foundry iron for a St. Louis melter—both for second quarter delivery. The market is easier, although quotations are nominally unchanged.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.16 freight from Chicago, $3.28 from Florence and Sheffield (rail and water), $5.17 from Birmingham, all rail, and 81c. average switching charge from Granite City:

Northern fdy., sil. 1.75 to 2.25	$26.66
Northern malleable, sil. 1.75 to 2.25	26.66
Basic	26.66
Southern fdy., sil. 1.75 to 2.25 (rail)	$26.67 to 27.17
Southern fdy., sil. 1.75 to 2.25 (rail and water)	24.78 to 25.28
Granite City iron, sil. 1.75 to 2.25	25.81 to 26.31

Finished Iron and Steel.—The Wabash Railway has decided, it is understood, to buy from 7500 to 10,000 tons of 90-lb. A. R. A. type A, rails, although the inquiry was for 5000 tons. The tonnage has not been allocated. Last year's purchases were made from the Illinois Steel Co., Inland Steel Co. and Bethlehem Steel Co. The Missouri Pacific has issued inquiries for 2250 under frames for 40-ton gondola cars and 250 under frames for 40-ton box cars, but it is not considered likely that steel will be used. The United Railways, St. Louis, is in the market for 100 tons of plates for car repairs. The Laclede Steel Co. has been awarded the contract for 425 tons of reinforcing bars for the Roxana Petroleum Building and 250 tons for the Snyder-Harney Building, Wichita Falls, Texas. The Missouri State Highway Commission will award road contracts on Feb. 28 for projects requiring 1000 tons of reinforcing bars.

For stock out of warehouse we quote: Soft steel bars, 3.15c. per lb.; iron bars, 3.15c.; structural shapes, 3.25c.; tank plates, 3.45c.; No. 10 blue annealed sheets, 3.90c.; No. 28 black sheets, cold rolled, one pass, 4.80c.; galvanized steel sheets, No. 28, 5.30c.; black corrugated sheets, 4.95c.; galvanized, 5.95c.; cold rolled rounds, shafting and screws stock, 3.95c.; structural rivets, 3.65c.; boiler rivets, 3.85c.; tank rivets, ⅞ in. diameter and smaller, 70 per cent off list; machine bolts, 55 per cent; carriage bolts, 50 per cent; lag screws, 60 per cent; hot pressed nuts, squares, $3.50; hexagons, blank or tapped, $4 off list.

Coke.—A consumer in the district bought 500 tons of foundry coke. The demand for industrial grades is fair but virtually all sales are from by-product ovens. Only an occasional order of beehive coke is sold in this market. The lead and zinc belt continues to use large quantities of coke.

Old Material.—Consumers in the St. Louis industrial district still refuse to buy with the result that further declines were recorded in prices of old material this week. The declining market has had the effect of shutting off shipments of material from the country dealers. The only bright spot is relaying rails—all weights being in good demand by industrial users. Iron axles and iron arch bars are in good demand. New railroad lists included the following: Burlington 6000 tons, Nickel Plate 5000 tons, Gulf Coast Lines 1000 tons, Frisco 500 tons.

We quote dealers' prices f.o.b. consumers' work, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton	
Iron rails	$17.50 to $18.00
Rails for rolling	18.50 to 19.00
Steel rails less than 3 ft.	20.00 to 20.50
Relaying rails, 60 lb. and under	25.00 to 26.00
Relaying rails, 70 lb. and over	32.50 to 33.50
Cast iron car wheels	18.50 to 19.00
Heavy melting steel	17.00 to 17.50
Heavy shoveling steel	17.00 to 17.50
Frogs, switches and guards cut apart	17.50 to 18.00
Railroad springs	20.75 to 21.25
Heavy axles and tire turnings	13.00 to 13.50
No. 1 locomotive tires	19.00 to 19.50
Per Net Ton	
Steel angle bars	16.50 to 17.00
Steel car axles	20.00 to 20.50
Iron car axles	24.50 to 25.00
Wrought iron bars and transoms	20.50 to 21.00
No. 1 railroad wrought	15.25 to 15.75
No. 2 railroad wrought	15.25 to 15.75
Cast iron borings	12.50 to 13.00
No. 1 busheling	15.00 to 15.50
No. 1 railroad cast	18.00 to 18.50
No. 1 machinery cast	19.00 to 19.50
Railroad malleable	16.00 to 16.50
Machine shop turnings	8.50 to 9.00
Champion bundled sheets	10.00 to 10.50

Buffalo

Not Enough Pig Iron Buying to Test Prices—Scrap Is Weaker

BUFFALO, Feb. 24.—The price situation in this market seems to be what it was last week, except that the amount of business offering is so small as to make it hardly worth while for any furnace interest to cut $23. Brokers' iron lying in Buffalo yard can probably still be had at $22 and it is understood on good authority that some of this iron has even found its way to certain buyers at less than $22. However, the furnaces are endeavoring to maintain $23 Buffalo as their base, relying on the exhaustion presently of the 15,000 tons of broker iron, sale of which has developed practically the only weakening influence in this market recently. The total inquiry developed for the week was about 2,000 tons.

We quote prices f.o.b. gross ton, Buffalo, as follows:

No. 2 plain, sil. 1.75 to 2.25	$22.00 to $23.00
No. 2X foundry, sil. 2.25 to 2.75	22.50 to 23.50
No. 1 foundry, sil. 2.75 to 3.25	23.50 to 24.50
Malleable, sil. up to 2.25	23.00
Basic	23.00
Lake Superior charcoal	29.28

Finished Iron and Steel.—The market is not so buoyant as it was at the beginning of the year and while one mill records the closing of some sizable tonnage contracts for the second quarter, the general feeling is of some concern for the constancy of future rolling schedules. On shape and bar tonnage, Buffalo mills are quoting a price of 2.465c. delivered Buffalo, in some instances and are booking some tonnage at that figure. Some tonnage has been booked as low as 2.365c. and 2.415c. No cutting of the 2.10c. Pittsburgh equivalent is noted.

Old Material.—The market has softened under the absence of buying which has characterized it for the past two weeks. Mills state that their present stocks are sufficient to satisfy their requirements for some

time to come and the only activity is the small transaction between dealer and dealer. Dealers will be active in this for the next six weeks or so, and in the meantime they hope for the return of the buying by mills. Yards are cleaned and no sizable stocks are available. The outside market demand is nil, there apparently being less activity at Youngstown and Pittsburgh than here. Among the transactions of the week was some buying of stove plate at $16. Cast scrap is weak and only an occasional order names specialties. Heavy melting steel is down a point with $18 the going price.

We quote prices f.o.b. gross ton, Buffalo, as follows:

Heavy melting steel	$18.00 to $18.50
Low phosphorus	20.50 to 21.00
No. 1 railroad wrought	15.00 to 15.50
Car wheels	18.50 to 19.50
Machine shop turnings	13.50 to 14.00
Cast iron borings	13.50 to 14.00
No. 1 busheling	17.50 to 18.00
Stove plate	16.00
Grate bars	13.00 to 13.50
Bundled sheets	12.50 to 13.00
Hydraulic compressed	17.50 to 18.00
Railroad malleable	19.00 to 20.00
No. 1 cast scrap	18.00 to 18.50
Iron axles	27.00 to 28.00
Steel axles	18.50 to 19.00

Cincinnati

Pig Iron Sales Very Light—Tennessee Iron Selling $20 Birmingham

CINCINNATI, Feb. 24.—The local pig iron market is extremely quiet. Sales have been limited to a few carloads, while inquiries have been scarce. The furnace of the Norton Iron Works, Ashland, Ky., was relighted on Feb. 19. There have been no price changes in Northern iron in the Ironton district, quotations being from $22 to $23, furnace. However, there has been little opportunity to test prices due to absence of sales. Southern iron continues at the same price level, $20 to $22, Birmingham. The former quotation applies to Tennessee iron. The tone of the local market is good in view of the sluggish condition that prevails.

Based on freight rates of $4.05 from Birmingham and $2.27 from Ironton we quote f.o.b. Cincinnati:

Southern fdy., sil. 1.75 to 2.25 (base)	$24.05 to $25.05
Southern fdy., sil. 2.25 to 2.75	24.55 to 25.55
Southern Ohio silvery, 8 per cent	32.77
Southern Ohio fdy., sil. 1.75 to 2.25	24.27 to 25.27
Southern Ohio, basic (nominal)	24.27
Southern Ohio malleable	24.27 to 25.27

Sheets.—Conditions are quiet at present. The trade is, generally speaking, well supplied for immediate needs. Business for the second quarter has been below expectations, although orders have been received from automobile manufacturers for April shipment. Prices are not as strong as they were. Black sheets are selling at 3.60c., Pittsburgh, a reduction from last week's quotation. Other prices in the local market are 2.70c. for blue annealed sheets, 4.60c. for auto and 4.85c. for galvanized sheets.

Structural Steel.—The Fraser Paper Mill, Madawaska, Me., has awarded a contract for 600 tons to the McClintic-Marshall Co. The Penn Bridge Co. is to erect a bridge for the Louisville and Nashville Railroad Co. on the N. and M. Division in Alabama. The contract calls for 300 tons. Only a few inquiries have been received locally in the past week, none of which is for large amounts.

Tin Plate.—The outlook is favorable for large production by canners this year. The movement of tin plate at present is in satisfactory volume and prices are steady at $5.50 per base box, Pittsburgh.

Reinforcing Bars.—There have been no sales of consequence in the past week, but inquiries have been good, and it is expected that several good contracts will be let shortly. Prices are firm at 2c. to 2.10c., mill.

Finished Materials.—Sales have been fair, although business is rather quiet. Bars, shapes and plates are firm at 2.20c., Pittsburgh. Little second quarter business is being placed at the moment. Sales of wire products have been good in the last few weeks, but it is thought that the immediate future will bring a falling off in the volume of business. Conditions are spotty in the jobbing trade. Prices are strong at 2.60c., Pittsburgh, for plain wire and 2.85c., Pittsburgh, for nails. Some sellers are asking 2.70c. for plain wire and 2.95c. for nails, but no sales have been reported at these quotations. Demand for light rails is at a low point. Inquiries for track fastenings have been brisk.

Warehouse Business.—Dealers state that the volume of business is about equal to that in January. Buying is being done conservatively, and no decided improvement in conditions is looked for in the immediate future. Prices are firm with no changes recorded as compared with a week ago. An advance in the price of galvanized sheets is expected in the next week. Business in galvanized sheets is good and will continue at its present level with favorable weather conditions.

Cincinnati jobbers quote: Iron and steel bars, 3.40c.; reinforcing bars, 3.30c.; hoops, 4.35c.; bands, 3.95c.; shapes, 3.40c.; plates, 3.40c.; cold-rolled rounds, 4.05c.; cold-rolled flats, squares and hexagons, 4.55c.; open-hearth spring steel, 4.75c. to 5.75c.; No. 10 blue annealed sheets, 3.90c.; No. 28 black sheets, 4.60c.; No. 28 galvanized sheets, 5.75c.; No. 9 annealed wire, $3.25 per 100 lb.; common wire nails, $3.25 per keg base; cement coated nails, $2.65 per keg.

Coke.—The coke market is not so firm as it was a week ago. Business is quiet. Shipments on contract are fair. Although prices are unchanged, they have weakened somewhat in the past seven days.

Connellsville furnace, $3.75; foundry, $4.50 to $5.50; New River foundry, $8.50; Wise County furnace, $3.75; foundry, $4.50 to $5.50; by-product foundry, $6.50 Connellsville basis.

Old Material.—The scrap market is slightly depressed as compared with a week ago. Dealers, however, are holding up quotations by their reluctance to sell at less than asking prices. Consumers have bought little in the past week. Prices are firm with only a few changes recorded.

We quote dealers' buying prices, f.o.b. cars, Cincinnati:

Per Gross Ton	
Heavy melting steel	$14.50 to $15.00
Scrap rails for melting	14.50 to 15.00
Short rails	18.50 to 19.00
Relaying rails	29.50 to 30.00
Rails for rolling	16.00 to 16.50
Old car wheels	14.00 to 14.50
No. 1 locomotive tires	17.50 to 18.00
Railroad malleable	16.50 to 17.00
Agricultural malleable	15.50 to 16.00
Loose sheet clippings	11.50 to 12.00
Champion bundled sheets	12.50 to 13.00
Per Net Ton	
Cast iron borings	11.00 to 11.50
Machine shop turnings	10.00 to 10.50
No. 1 machinery cast	18.50 to 19.00
No. 1 railroad cast	15.50 to 16.00
Iron axles	22.50 to 23.00
No. 1 railroad wrought	12.00 to 12.50
Pipes and flues	9.50 to 10.00
No. 1 busheling	11.00 to 11.50
Mixed busheling	9.50 to 10.00
Burnt cast	11.00 to 11.50
Stove plate	11.50 to 12.00
Brake shoes	12.00 to 12.50

Detroit Scrap Again Declines

DETROIT, Feb. 24.—Prices on old material in this district have registered further declines during the past week, notably blast furnace scrap, which has fallen off from 50c. to 75c. per ton. One or two of the larger mills that depend on their supply from Detroit have held up shipments and sales have been in small lots. With the Youngstown and Cleveland mills out of the market, Detroit prices, to reach further points with a longer freight haul have of necessity been forced lower to meet competition.

The following prices are quoted on a gross ton basis f.o.b. producers' yards, excepting stove plate, No. 1 machinery cast and automobile cast, which are quoted on a net ton basis:

Heavy melting and shoveling steel	$15.50 to $16.00
Borings and short turnings	12.25 to 12.75
Long turnings	12.00 to 12.50
No. 1 machinery cast	18.50 to 19.00
Automobile cast	21.50 to 22.50
Hydraulic compressed	13.50 to 14.25
Stove plate	16.50 to 17.50
No. 1 busheling	13.00 to 14.00
Sheet clippings	11.25 to 11.75

Cleveland

Finished Material Not Very Active—Bolts and Nuts Selling Plan Changed

CLEVELAND, Feb. 24.—The finished steel market lacks life, although there is a fair volume of small miscellaneous orders and consumers as a rule continue to take material in good quantities on contracts. The demand from the automobile industry is still dragging with very cautious buying, but reports from Detroit indicate some increase in production schedules and considerable improvement is looked for in March. The Ford Motor Co. has increased production, going from a five to six-day week schedule. Some makers of automobile stampings are not issuing releases until they receive orders and then urge the mills to make quick shipments. Inquiry is light in the building field, although local architects are working on plans for buildings that will require several thousand tons of steel. The McKinney Steel Co. is taking bids for its finishing mill buildings, requiring 5000 to 6000 tons of structural material. Kansas City has sent out an inquiry for a riveted pipe line requiring 5000 tons of plates on which Ohio shops are figuring.

Little change has developed in the price situation. Some of the independent mills are still quoting steel bars at 2.10c., Pittsburgh, and second quarter contracts are being closed at that price, although small lots are being sold at 2.20c. On plates 2.10c. appears to be the more common price, although some mills are quoting 2.20c. and making small lot sales at that price. Structural material ranges from 2.10c. to 2.20c., the lower price for round lots. Hot-rolled strip steel in wide material continues irregular with a price range of from 2.25c. to 2.40c.

Pig Iron.—Buying continues light and is confined for the most part to small lots. However, sales improved during the week with one Lake furnace which sold 4000 tons of foundry and malleable iron and has a new inquiry for 500 tons including one 1500-ton lot. Stocks in furnace yards are low, as producers generally are shipping out all the iron that they are making. Operations of malleable foundries have improved and stove and radiator foundries in the Central West are going at good capacity. On the other hand, business with some foundries has not picked up to the extent they had expected and some of these will carry first quarter iron well into the second quarter. The Lake furnace price is holding to $23 for foundry and malleable iron, but prices are untested on business in which Valley iron comes in competition. Prices in the Valley district still range from $22 to $22.50.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a $3.02 freight rate from Jackson and $6 rate from Birmingham:

Basic, Valley furnace	$22.00
N'th'n No. 2 fdy., sil. 1.75 to 2.25	23.75 to 24.00
Southern fdy., sil. 1.75 to 2.25	26.01 to 27.01
Malleable	23.75 to 24.00
Ohio silvery, 8 per cent	33.52
Standard low phos., Valley furnace	29.00

Iron Ore.—Consumption of Lake Superior ore during January amounted to 5,241,992 tons, an increase of 700,126 tons over 4,541,866 tons in December. During January, 1924, the amount consumed was 4,687,947 tons. Ore on hand at furnaces Feb. 1 was 24,429,875 tons and the amount at furnaces and Lake Erie docks on that date was 31,153,594, as compared with 33,990,920 tons on the same day a year ago. On Jan. 31 there were 220 furnaces in blast using Lake ore, an increase of 18 stacks during the month. Interior furnaces in the central district during January consumed 2,926,352 tons of ore, a gain of 386,078 tons over December; Eastern furnaces consumed 122,609 tons, a gain of 21,839 tons, Lake front furnaces used 2,086,082 tons or a gain of 277,309 tons and all-rail furnaces consumed 106,949 tons, a gain of 14,900 tons.

Ore Prices.—Ore firms have not yet quoted on the inquiry of the Ford Motor Co. for 160,000 tons of Lake Superior ore. A few other inquiries for small lots have come out, but prices will probably not be established for several weeks.

Semi-Finished Steel.—Some inquiry is coming out for sheet bars and with the supply plentiful at $38, Youngstown, buyers are attempting to secure somewhat lower quotations but no shading of this price is reported.

Sheets.—Some of the mills report a slight improvement in specifications due to the increase in operations by automobile plants, but new business is light. Prices are irregular and little, if any, attempt is being made by independent mills to secure business at the recent price advances and quotations on a mill or a Youngstown base appear to be becoming more common. Blue annealed sheets can be bought at 2.70c. for the second quarter and galvanized sheets at 4.65c. to 4.75c. for early shipment. Black sheets range from 3.50c. to 3.60c.

Coke.—Sales of foundry coke are light, consumers buying only for immediate requirements. Prices of standard grades of Connellsville foundry coke range from $4.75 to $5.75 per ton but some makes are available at less than the maximum price named.

Old Material.—The market has no support and prices have further declined 50c. a ton or more on most grades. Borings and turnings are weak and a drug on the market. Both borings and turnings sold at $15 during the week, but would not bring that price today. Dealers' orders are pretty well filled except from mills that are holding back on shipments. Most of the local heavy melting steel scrap at present is going to Lorain to fill orders recently placed by the National Tube Co.

We quote dealers' prices f.o.b. Cleveland per gross ton:

Heavy melting steel	$17.00 to $17.25
Rails for rolling	18.50 to 18.75
Rails under 3 ft	19.50 to 20.00
Low phosphorus melting	19.50 to 20.00
Cast iron borings	14.25 to 14.50
Machine shop turnings	14.25 to 14.50
Mixed borings and short turnings	14.25 to 14.50
Compressed sheet steel	15.00 to 15.25
Railroad wrought	14.75 to 15.00
Railroad malleable	20.00 to 20.50
Light bundled sheet stampings	12.25 to 12.50
Steel axle turnings	15.75 to 16.00
No. 1 cast	19.00 to 19.50
No. 1 busheling	14.00 to 14.25
Drop forge flashings	12.75 to 13.00
Railroad grate bars	15.25 to 15.50
Stove plate	15.25 to 15.50
Pipes and flues	11.00 to 11.25

Bolts, Nuts and Rivets.—Bolt and nut manufacturers Feb. 20 abandoned the system of quoting delivered prices within certain zone limits adopted early last December and have gone back to the basing points on the heavier lines, including machine and carriage bolts and nuts, but some are as yet undecided whether they will adopt the basing points system for stove and tire bolts. There will be three basing points, Pittsburgh, Cleveland and Chicago. Before the zoning system went into effect the use of Cleveland as a basing point was confined for the most part to business taken by Cleveland manufacturers for Cleveland delivery. Now Cleveland occupies the same position as the other two cities as a basing point. Under the zone system, full freight was allowed by manufacturers within certain zone limits and prices were marked up somewhat more than sufficient to cover the freight charges. Bolt and nut manufacturers expected that by quoting uniform delivered prices within zone limits there would be a tendency to localize business as it would be of interest to a manufacturer to sell his output in consuming centers near his plant and having the lowest freight rates. However, the plan met strong opposition from the jobbers, as it had the tendency to drive them out of the business of distributing bolts and nuts for the reason that a small consumer at a distant point had to pay no more for bolts and nuts delivered than the jobber located in the same city with the bolt and nut factory. Also the large jobbers located in cities having bolt and nut works had no price advantage over a small distributor located at some distance from the place of manufacture, as the delivered price to both was the same. With the reestablishment of basing points, manufacturers have not changed their discounts, the recently quoted delivered prices now being f.o.b. basing point. This means a price advance to the manufac-

turer to the amount of freight between the basing and receiving points. Specifications are fair, but not as heavy as last month. Large rivets are firm at 2.60c. Cleveland and Pittsburgh but small rivets are weak.

Jobbers quote steel bars, 3.10c.; plates and structural shapes, 3.20c.; No. 28 black sheets, 4.35c.; No. 28 galvanized sheets, 5.45c.; No. 10 blue annealed sheets, 3.45c. to 3.60c.; cold-rolled rounds, 4c.; flats, squares and hexagons, 4.50c.; hoops and bands, 1 in. and wider and 20 gage and heavier, 3.85c.; narrower than 1 in., all gages, 4.35c.; No. 9 annealed wire, $3.25 per 100 lb.; No. 9 galvanized wire, $3.70 per 100 lb.; common wire nails, $3.35 base per 100 lb.

Philadelphia

Some Improvement in Shapes and Plates, but Market in General Dull

PHILADELPHIA, Feb. 24.—New business coming to finishing mills in this district continues to be relatively light. Slight improvement, however, has developed in orders for both plates and shapes. One producer of plates reports that business taken last week was double that of the week previous. Structural orders come from miscellaneous sources. On the whole they call for only small lots, but one fair-sized fabricating job has been placed in this district by a railroad.

Pressure for delivery for plates is not so great as it was owing to an easing off in specifications and in consequence deliveries now are being promised in three to four weeks. The Baldwin Locomotive Works has been awarded thirty locomotives by the St. Louis & San Francisco Railroad, the steel to be furnished by a Cleveland mill. Plates and shapes are quoted at 2.10c. base, Pittsburgh, on the more attractive business with 2.20c., base, still named on less desirable tonnage, but the market is by no means firm at these figures. Steel bars are quoted at 2.20c. base, Pittsburgh, for second quarter delivery. Pig iron inquiries are moderate, sales are light and prices unchanged. The market for scrap is listless with a decline in price of several grades, though no real test of price structure has been made through sizable purchases.

Shapes.—Both inquiries and new business for shapes have improved somewhat. Fabricators report some fair sized orders from miscellaneous sources, with one rather sizable contract closed with a railroad. The generally quoted price on desirable business is 2.10c. base, Pittsburgh, although the market is not firm owing to some large buyers still receiving shipments against contracts which were closed at 1.90c. to 2c., Pittsburgh. With improvement in specifications against newer contracts at higher prices, fabricating interests are expecting that this movement, together with approaching warm weather, will stimulate the market considerably.

Pig Iron.—While several inquiries requiring fair sized tonnages are out for foundry grades, the market for pig iron is quiet and prices unchanged. There seems to be an expectancy on the part of melters that lower prices are pending and they are holding off purchases in consequence. Furnace interests, however, are resisting pressure and say that production costs do not justify such an attitude on the part of prospective buyers. Buying that is taking place is for second and third quarter delivery. One maker is not quoting beyond April 1, but this is an exceptional position, although several do not quote beyond the second quarter. There have been a number of small lots of low phosphorus iron sold in this district, which is meeting rather severe competition, and prices are easy at $25.50 to $26, furnace, for the standard grade. No. 2 plain iron is quoted at $23.50 to $24, furnace. The market for basic iron is extremely dull and the quotation on this grade remains nominal. Producers in this district maintain that imports are depressing the market and are continuing their effort for the application of the anti-dumping act. It was stated here today that the Treasury Department has issued two anti-dumping notices on the strength of imports of Indian iron received last December at Galveston. Imports of pig iron to this port the past week included 5606 tons from England, 5100 tons from Germany, 2528 tons from British India and 98 tons from France. Iron ore imports totaled 13,126 tons—5426 tons from Sweden and 7700 tons from Algiers.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rate varying from 76c. to $1.63 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$24.26 to $25.13
East. Pa. No. 2X, 2.25 to 2.75 sil.	25.01 to 25.88
East. Pa. No. 1X	26.01 to 26.88
Virginia No. 2 plain, 1.75 to 2.25 sil.	29.17 to 29.67
Virginia, No. 2X, 2.25 to 2.75 sil.	29.67 to 30.17
Basic delivered eastern Pa.	23.75 to 24.25
Gray forge	23.50 to 24.50
Malleable	24.50 to 25.00
Standard low phos. (f.o.b. furnace)	25.50 to 26.00
Copper bearing low phos. (f.o.b. furnace)	25.50 to 26.00

Billets.—The market for billets remains quiet. Forging steel is quoted at $42.50 to $43, Pittsburgh, and rerolling billets at $37.50 to $38, Pittsburgh.

Bars.—New business in steel bars is only moderate and prices for nearby delivery range from 2.10c. to 2.20c., Pittsburgh, depending on the tonnage required. The latter figure is named for second quarter shipment.

Warehouse Business.—While no change had been made in warehouse prices in this district, jobbers in nearby competitive territories are reported to have reduced quotations with the result that the market is somewhat easier outside this district. The softer tone reflected in the competitive market applies particularly to cold-rolled steel, sheets and soft steel bars. Tonnage taken by warehouses in February is about equal to that booked in April.

Soft steel bars and small shapes, 3.20c.; iron bars (except bands), 3.20c.; round edge iron, 3.50c.; round edge steel, iron finished, 1⅛ x ⅛ in., 3.50c.; round edge steel pianished, 4.30c.; tank steel plates, ¼ in. and heavier, 3.10c.; tank steel plates, ⅜ in., 3.25c.; blue annealed steel sheets, No. 10 gage, 3.85c.; black sheets, No. 28 gage, 4.85c.; galvanized sheets, No. 28 gage, 6c.; square, twisted and deformed steel bars, 2.85c.; structural shapes, 3.10c.; diamond pattern plates, ¼-in., 5.30c.; ⅜-in., 5.50c.; spring steel, 5c.; round cold-rolled steel, 4.15c.; squares and hexagons, cold-rolled steel, 4.65c.; steel hoops, 1 in. and wider, No. 20 gage and heavier, 3.95c.; narrower than 1 in., all gages, 4.45c.; steel bands, No. 12 gage to ⅜ in., inclusive, 3.95c.; rails, 3.20c.; tool steel, 8.50c.; Norway iron, 7c.

Old Material.—The market for scrap in this district is so listless that it has received no actual test as to its price structure. Quotations show some irregularity. There has been a softening, reflected in offerings in several lines and heavy melting steel now is quoted by some dealers at 50c. off, taking a range of $17 to $18. Small lots, however, have moved at levels slightly higher than the current market. Old rails, cast iron wheels, No. 1 forge fire, heavy axle turnings, cast borings for chemical plants and No. 1 cast scrap are down 50c., while there has been a decline of $1 in low phosphorus and shafting.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$17.00 to $18.00
Scrap rails	17.00 to 17.50
Steel rails for rolling	18.50 to 19.00
No. 1 low phos. heavy 0.04 and under	21.50 to 22.50
Couplers and knuckles	21.50 to 22.50
Rolled steel wheels	21.50 to 22.00
Cast-iron car wheels	19.00 to 19.50
No. 1 railroad wrought	20.00 to 20.50
No. 1 yard wrought	18.00 to 18.50
No. 1 forge fire	14.50 to 15.00
Bundled sheets (for steel works)	14.50 to 15.00
Mixed borings and turnings (for blast furnace use)	13.00 to 13.50
Machine shop turnings (for steel works use)	14.50 to 15.00
Machine shop turnings (for rolling mill use)	15.00 to 15.50
Heavy axle turnings (or equivalent)	16.00 to 16.50
Cast borings (for steel works and rolling mill)	14.00 to 14.50
Cast borings (for chemical plants)	18.50 to 19.00
No. 1 cast	18.50 to 19.00
Heavy breakable cast (for steel plants)	16.50 to 17.00
Railroad grate bars	15.00 to 15.50
Stove plate (for steel plant use)	15.00 to 15.50
Wrought iron and soft steel pipes and tubes (new specifications)	16.50 to 17.00
Shafting	22.00 to 23.00
Steel axles	23.00 to 24.00

Plates.—While improvement in new business for plates is not great, it is nevertheless fair. Prices are only moderately firm at 2.10c., Pittsburgh, for the

larger tonnages as against a quotation of 2.20c., Pittsburgh, named on the smaller lots. Pressure for delivery is not so heavy as it has been and as a result deliveries have been cut to three to four weeks. Operations vary from 65 to 80 per cent of capacity. The city of Philadelphia has put out an inquiry for 10 dump barges which will require approximately 1800 tons of plates. The Baldwin Locomotive Works has taken a contract for 30 locomotives calling for about 1200 tons of plates, which will be placed with a Cleveland mill. The Ericsson Steamship Line is reported to have put out an inquiry for two boats.

Will Build Seamless Tube Mill

President Campbell, Youngstown Sheet & Tube Co., Announces Plan for Important Additions at Indiana Harbor or at East Youngstown

YOUNGSTOWN, Feb. 24.—President James A. Campbell announces that the Youngstown Sheet & Tube Co. has authorized construction of a seamless tube mill at an estimated cost of $2,000,000, to be built this year. It will roll tubes from 4¾ to 8⅝ in. in diameter, and will have an annual capacity of 100,000 tons or more. Whether this unit will be located at Indiana Harbor, Ind., or at East Youngstown, yet remains to be determined.

"Our oil country trade demands a seamless tube for deep drilling purposes," states Mr. Campbell. "Rotary drilling of wells is becoming common practice, and such an operation requires pipe with a higher carbon content than wrought steel pipe. We will not manufacture small seamless tubes for boiler and other purposes."

The company has also developed plans for 12 sheet mills at the Chicago property, and from 12 to 24 tin mills, the number yet to be decided.

The seamless tube mill is the result of demand for such a product from the California oil fields in particular, where most of the output will be shipped. For over a year the Sheet & Tube company's engineers have been studying various types of seamless tube mills in an intensive way. Vice-President C. S. Robinson last summer visited several such properties in Germany, while two of the company's engineers have just returned from several months abroad on a similar mission.

It is estimated the company will spend in current and projected improvements approximately $20,000,000, which will come from earnings.

Two weeks ago the directors appropriated $2,000,000 for a Morgan combination sheet bar and skelp mill for the Chicago property.

With the projected extensions the company will have 21 pipe mills, 42 sheet mills and an indeterminate number of tin plate units.

Trade Changes

The De Laval Steam Turbine Co., Trenton, N. J., announces that all products of the company and those of the De Laval Separator Co., Poughkeepsie, N. Y., will be handled exclusively in New England by the Turbine Equipment Co. of New England, Chamber of Commerce Building, 80 Federal Street, Boston. F. R. C. Boyd, who for 15 years has been connected with the Power Equipment Co., the former representative, is president of the new Turbine Equipment Co.

S. W. Sargent & Co., 1600 Walnut Street, Philadelphia, has been appointed district sales manager of the Falcon Steel Co., Niles, Ohio, and the Falcon Tin Plate Co. in the Philadelphia district. They will promote the sale of black sheets, blue annealed sheets and auto body stock, also tin mill black plate.

The Orton & Steinbrenner Co., 608 South Dearborn Street, Chicago, and Huntington, Ind., manufacturer of locomotive cranes, steam and gasoline dipper shovels, clam shell buckets and coal crushers, announces the appointment of the William M. Bailey Co., 508 Bakewell Building, Pittsburgh, as representative for Pittsburgh and surrounding territory. William M. Bailey, president of the company, was assistant to the president of the Carnegie Steel Co. for many years and also was connected with the Midvale and Cambria companies.

The Chicago Pneumatic Tool Co. has opened a branch office in Mexico at 1a San Juan De Letran, 15 Mexico, D. F.

The Pennsylvania Crusher Co., Stephen Girard Building, Philadelphia, has appointed the Stratton-Cahoon Co., 809 McIntyre Building, Salt Lake City, Utah, district agents for the sale of its coal preparation machinery and heavy duty primary, secondary and fine crushers for limestone, gypsum, cement rock and ores.

The Duff Mfg. Co., Pittsburgh, manufacturer of Duff and Barrett Jacks, has moved its New York Office from 50 Church Street to 250 Park Avenue. C. A. Methfessel is manager of sales in the Eastern District.

The Lewis-Patten Co., San Antonio, Tex., has been appointed sales representative for the McMyler-Interstate Co., Cleveland, covering Texas. The Lewis-Patten Co. will specialize in gasoline and steam shovels, clam shell buckets and standard gage locomotive cranes.

Hayes & Coit, Leader Building, Cleveland, now represent the Lancaster Steel Products Corporation, Lancaster, Pa., in all of Ohio and in Buffalo and vicinity. W. J. Hayes was formerly with the Superior Nut & Bolt Co., Cleveland, and W. C. Coit with the Co-operative Stove Co.

The Standard Turbine Corporation, Scio, N. Y., has appointed the following district representatives: J. F. Shouse & Co., 70 Kenyon Building, Louisville, Ky., and Bradley T. Johnson, 708 Mutual Building, Richmond, Va.

The Koppel Sales Co., Inc., Rialto Building, San Francisco, Pacific Coast representative of the Koppel Industrial Car & Equipment Co., will operate as the Pacific Coast branch of the parent company. Stocks will be carried in San Francisco and Los Angeles for immediate delivery.

The Acme Steel Goods Co., Chicago, has changed its corporate style to the Acme Steel Co.

The Bowles Co., Seattle, Wash., dealer in plumbers' and steam fitters' supplies, will open branch warehouses in Tacoma, Wash., and Portland, Ore. The company has secured a building in Tacoma, which will be remodeled. It is negotiating for a building in Portland, but if unable to find one, it will buy property and erect a building.

The Moline Foundry Co., Moline, Ill., has changed its corporate style to the Moline Foundry & Machine Co.

B. Nicoll & Co., New York, importer of iron and steel, has opened an office in the Rialto Building, San Francisco, in charge of C. G. Claussen, who will supervise Pacific Coast business.

Allen & Drew, Inc., 80 Boylston Street, Boston, has been made Massachusetts and Rhode Island representative for Gillis & Geohegan, Inc., New York, hoisting equipment. W. C. Chapman, formerly with the Warner Miller Co., New Haven, will represent the company in Connecticut.

L. O. Koven & Brother, Inc., has discontinued its Cleveland office and will conduct sales exclusively from the home office and works at 154 Ogden Avenue, Jersey City, N. J. The corporation has an engineering staff engaged in designing special sheet steel and steel plate construction, and manufactures sandblast machines.

The Banner-Mahoning Furnace Co., Youngstown, Ohio, manufacturer of iron furnaces, etc., has opened a branch office and distribution warehouse at 1113 Peach Street, Erie, Pa., in charge of O. H. Chain.

Engineering research activities of the C. J. Tagliabue Mfg. Co., Brooklyn, N. Y., will be conducted hereafter as a separate department, to be headed by Victor Wichum, who continues as chief engineer. Development work on indicating, recording and controlling instruments will continue under Frank Bast, whose department is known as the experimental department. Daniel C. Day will work on some of the more important problems of the users of instruments, under general sales manager Harvey D. Cooke. William C. Begeebing now heads the division in charge of automatic controllers, dial indicating and recording thermometers.

NON-FERROUS METALS

The Week's Prices

Cents per Pound for Early Delivery

	Copper, New York		Straits Tin (Spot)	Lead		Zinc	
Feb.	Lake	Electrolytic*	New York	New York	St. Louis	New York	St. Louis
18	14.87½	14.25	56.87½	9.20	8.90	7.85	7.50
19	14.87½	14.25	57.00	9.20	8.90	7.90	7.55
20	14.87½	14.37½	57.12½	9.20	8.90	7.95	7.60
21	14.87½	14.37½	....	9.20	8.90	7.95	7.60
24	15.00	14.50	57.00	9.20	8.90	7.90	7.55

*Refinery quotation; delivered price ¼c. higher.

New York

NEW YORK, Feb. 24.

The holiday yesterday has intensified a dullness which has been prevalent in most of the markets for some time. Copper after selling lower has become firmer and is advancing. The tin market has been exceedingly quiet with an absence of consumer buying. The lead market is easy and generally quiet. Zinc, while continuing fairly firm, is not active.

Copper.—After several days of weakness and selling by one or two interests at fairly low prices, the electrolytic market is becoming more active and prices are tending higher. Today there is considerable inquiry from consumers and more interest is being shown than in some days. Last week the metal sold as low as 14.50c., delivered, but most sellers were asking considerably higher prices. Today the minimum is 14.75c., delivered, with some quotations at 14.87½c. Sellers are generally expecting a fair amount of buying for at least the latter part of the second quarter. Most of the buying in the past has been for first quarter and April delivery, with some consumers allowed to cover for part of May at least. The export market is reported as quiet, although some sales have been made. More interest, however, is being shown in that market in the last few days. Lake copper is quoted at 15c., delivered.

Tin.—The past week has been practically a repetition of the one before, with the market exceedingly quiet and dull. Total sales have amounted to about 500 to 600 tons, practically all the business being done with dealers. Consumers continue to show no interest and to make no purchases. With practically no business done since Friday, because of the holiday, an accumulation of orders was looked for today, but these did not materialize and the market was only moderately active with about 200 tons sold. Spot Straits tin today was quoted at 57.00c., New York. London quotations today were about the same as a week ago with spot standard at £262 7s. 6d., future standard at £265 5s. and spot Straits at £265 17s. 6d. The Singapore price yesterday was £267 5s. Arrivals thus far this month have been 5055 tons with 6365 tons reported afloat.

Lead.—There is a little pressure to sell by some but the market is quiet. On Feb. 17 the leading interest again reduced its contract price from 9.50c. to 9.25c., New York. In the outside market quotations range from 8.90c. to 9c., St. Louis. The Eastern price is generally 9.25c., New York, with some small lots available at 9.20c.

Zinc.—The market is quite dull but prices are fairly firm at 7.52½c. to 7.57½c., St. Louis, or 7.87½c. to 7.92½c., New York. Interest on the part of domestic consumers is only moderate and there is very little export buying.

Nickel.—Shot and ingot nickel in wholesale lots are quoted at 31c. to 32c. per lb., with electrolytic nickel quoted at 38c.

Antimony.—The spot market is easier with Chinese metal available at about 18.50c. to 19c., New York, and with metal due to arrive early in March quoted at considerably less.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 27c. to 28c. per lb., delivered.

Old Metals.—Demand is a little more active and prices are firmer. Dealers' selling prices are as follows in cents per lb.:

Copper, heavy and crucible	14.25
Copper, heavy and wire	13.50
Copper, light and bottoms	11.50
Heavy machine composition	10.75
Brass, heavy	9.00
Brass, light	7.75
No. 1 red brass or composition turnings	10.00
No. 1 yellow rod brass turnings	9.50
Lead, heavy	8.00
Lead, tea	7.00
Zinc	4.75
Cast aluminum	19.00
Sheet aluminum	19.00

Chicago

FEB. 24.—Tin and lead have declined, while the other metals remain unchanged. A fair amount of business is being placed, but buying is confined to nearby requirements. The quotation on antimony is largely nominal in view of the scarcity of the metal, but no pressure has developed to cause a further advance in price. Old metal prices remain unchanged. We quote, in carload lots: Lake Copper, 15c.; tin, 58c.; lead, 9.10c.; zinc, 7.65c.; in less than carload lots, antimony, 21c. On old metals we quote copper wire, crucible shapes and copper clips, 12c.; copper bottoms, 10c.; red brass, 9c.; yellow brass, 8c., lead pipe, 8.25c.; zinc, 4.50c.; pewter, No. 1, 30c.; tin foil, 42c.; block tin, 50c.; all buying prices for less than carload lots.

Production and Imports of Pyrites Less

Production of pyrites in the United States, according to the Geological Survey, dropped from 181,628 gross tons, valued at $661,000, in 1923 to 160,096 tons, valued at $645,262, in 1924 and, with the exception of 1921, when only 157,118 tons were produced, was the smallest recorded since 1897. The average value per ton was $4.03 in 1924 as compared with $3.64 in 1923. Although the production of pyrites dropped 12 per cent in 1924, the quantity of pyrites sold and consumed by producing companies dropped only 6 per cent, from 170,997 tons in 1923 to 160,075 tons in 1924.

Imports of pyrites containing more than 25 per cent of sulphur amounted in 1924 to 243,237 gross tons, valued at $582,794, according to the Bureau of Foreign and Domestic Commerce. Of this amount 242,786 tons, or 98.8 per cent, was imported from Spain. In 1923 the imports were 263,695 tons, valued at $1,254,389, of which 252,862 tons, about 95.9 per cent, came from Spain. The imports records for 1924 and 1923 indicate a decrease of about 50 per cent in the average value per ton of pyrites imported.

The Youngstown Steel Car Door Co. has been organized by Cleveland and Youngstown interests affiliated with the Youngstown Sheet & Tube Co. and will manufacture a steel car door of a new design. For the present this will be made at the plant of the Midland Steel Products Co., Cleveland, but the company plans to provide a plant of its own later. James A. Campbell, president, Youngstown Sheet & Tube Co., is president of the new company. Among others interested in it are Samuel Mather, H. G. Dalton and Harry Colby, of Pickands, Mather & Co., and J. L. Severance, Cleveland.

Automobile manufacturers, reassured by the evidences of increasing demand coming to them from all sections of the country, have increased their 1925 schedules, according to *Automotive Industries*. Revised predictions are to the effect that 1925 production of motor vehicles not only will pass that of the preceding year, but will come up to the peak figures of 1923, when the 4,000,000 mark was passed. The bogey of price cutting is believed passed, one manufacturer having announced advances in prices.

Prices of Finished Iron and Steel Products (Carload Lots)

Tank Plates

F.o.b. Pittsburgh mill, base, per lb.....2c. to 2.20c.
F.o.b. Chicago, base, per lb.....2.30c.

Structural Shapes

F.o.b. Pittsburgh mills, base, per lb.....2.10c. to 2.20c.
F.o.b. Chicago, base, per lb.....2.30c.

Iron and Steel Bars

Soft steel bars f.o.b. P'gh mills, base, per lb....2.10c. to 2.20c.
Soft steel bars f.o.b. Chicago, base, per lb.....2.20c.
Reinforcing steel bars f.o.b. P'gh mills, base, per lb. 2.10c. to 2.20c.
Rail steel bars, f.o.b. Chicago district mills, base, per lb. 2.10c.
Common iron bars, f.o.b. Chicago, base, per lb.....2c.
Refined iron bars, f.o.b. P'gh mills, base, per lb. 3.00c. to 3.10c.
Common iron bars, eastern Pa. mill, base, per lb.....2.10c.

Hot-Rolled Flats

Hoops, base, per lb., Pittsburgh.....2.50c.
Bands, base, per lb., Pittsburgh.....2.40c. to 2.50c.
Strips, Pittsburgh.....2.40c. to 2.50c.
Strips, Chicago.....2.55c. to 2.60c.

Cold-Finished Steel

Screw stock and shafting, f.o.b. P'gh mills, base, per lb..2.80c.
Screw stock and shafting, f.o.b. Chicago, base, per lb....2.80c.
Screw stock, base, per lb., Cleveland.....2.75c. to 2.85c.
Shafting, ground, f.o.b. mill, base, per lb.....3.20c.
Strips, f.o.b. P'gh mills, base, per lb.....4c. to 4.15c.
Strips, f.o.b. Cleveland mills, base, per lb.....4c. to 4.15c.
Strips, f.o.b. Chicago mills, base, per lb.....4.45c.
Strips, f.o.b. Worcester mills, base, per lb.....4.30c.

Wire Products

(To jobbers in car lots f.o.b. Pittsburgh and Cleveland)

Nails, base, per keg	$2.85 to $2.95
Galvanized nails, 1-in. and longer, base plus	2.25
Galvanized nails, shorter than 1-in., base plus	2.50
Bright plain wire, base, No. 9 gage, per 100 lb.	2.60 to 2.70
Annealed fence wire, base, per 100 lb.	2.75 to 2.85
Galvanized wire, No. 9, base, per 100 lb.	3.20 to 3.30
Galvanized barbed, base, per 100 lb.	3.55 to 3.65
Galvanized staples, base, per keg	3.55 to 3.65
Painted barbed wire, base, per 100 lb.	3.30 to 3.40
Polished staples, base, per keg	3.30 to 3.40
Cement coated nails, base, per count keg	2.15 to 2.25
*Bale ties, carloads to jobbers	75, 15 and 5 per cent off list
*Bale ties, carloads to retailers	75, 10 and 6 per cent off list
Woven wire fence, base, per net ton to retailers	$67.00

Chicago district mill prices are $2 per ton above the foregoing and Chicago delivered prices are $3 per ton above the prices f.o.b. Cleveland and Pittsburgh. Birmingham mill prices $3 a ton higher; Worcester, Mass., mills $3 a ton higher on production of that plant, and Duluth, Minn., mills $2 a ton higher; Anderson, Ind., $1 higher.

*F.o.b. Cleveland.

Sheets

Blue Annealed
(base) per lb.

Nos. 9 and 10, f.o.b. Pittsburgh dist. mill.....2.70c. to 2.80c.
Nos. 9 and 10 (base) per lb., f.o.b. Chicago dist. mills..2.80c.

Box Annealed, One Pass Cold Rolled

No. 28 (base) per lb., f.o.b. Pittsburgh dist. mill.3.50c. to 3.70c.
No. 28 (base) per lb., f.o.b. Chicago dist. mill..3.70c. to 3.80c.

Galvanized

No. 28 (base) per lb., f.o.b. Pittsburgh dist. mill.4.75c. to 4.85c.
No. 28 (base) per lb., f.o.b. Chicago dist. mill...4.85c. to 4.95c.

Tin-Mill Black Plate

No. 28 (base) per lb., f.o.b. Pittsburgh dist. mill.3.50c. to 3.70c.
No. 28 (base) per lb., f.o.b. Chicago dist. mill.....3.70c.

Automobile Body Sheets

No. 22 (base) per lb., f.o.b. mill.....4.60c. to 4.75c.

Long Ternes

No. 28 (base) 8-lb. coating, per lb., f.o.b. mill.....4.90c.

Tine Plate

Standard cokes, per base box f.o.b. Pittsburgh district mills $5.50
Standard cokes, per base box f.o.b. Chicago district mills 5.60
Standard cokes, per base box f.o.b. Elwood, Ind..... 5.60

Terne Plate

(F.o.b. Morgantown or Pittsburgh)
(Per Package, 20 x 28 in.)

8-lb. coating, 100 lb. base	$11.20	20-lb. coating I. C.	$15.50
8-lb. coating I. C.	11.50	25-lb. coating I. C.	17.00
15-lb. coating I. C.	14.35	30-lb. coating I. C.	18.35
		40-lb. coating I. C.	20.35

Rivets

Large, f.o.b. P'gh and Cleveland mills, base, per 100 lb..$2.60
Large, f.o.b. Chicago, base, per 100 lb..... 2.75
Small, f.o.b. P'gh and Cleveland mills 70, 10 and 5 per cent off list
Small (freight allowed within zone limits) 70 and 10 to 70 off list

Rails and Track Equipment

(F.o.b. mill)

Rails, standard, per gross ton	$43.00
Rails, light, billet, base, per lb.	1.80c. to 1.90c.
Rails, light rail steel, base, per lb.	1.65c. to 1.75c.
Spikes, 5/16 in. and larger, base, per 100 lb.	$2.90 to $3.20
Spikes, 1/2 in. and smaller, base, per 100 lb.	3.10 to 3.50
Spikes, boat and barge, base, per 100 lb.	3.25
Track bolts, all sizes, base, per 100 lb.	3.90 to 4.25
Tie plates, per 100 lb.	2.35 to 2.50
Angle bars, base, per 100 lb.	2.75

Welded Pipe

(F.o.b. Pittsburgh district mills)

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
1/8	45	19 1/2	1/4 to 3/8	+11	+39
1/4 to 3/8	51	25 1/2	1/2	22	2
1/2	56	42 1/2	3/4	28	11
5/8	60	48 1/2	1 to 1 1/2	30	13
1 to 3	62	50 1/2			

Lap Weld

2	55	43 1/2	2	23	7
2 1/2 to 6	59	47 1/2	2 1/2	26	11
7 and 8	56	43 1/2	3 to 6	28	13
9 and 10	54	41 1/2	7 to 12	26	11
11 and 12	53	40 1/2			

Butt Weld, extra strong, plain ends

1/8	41	24 1/2	2 to 3	61	50 1/2
1/4 to 3/8	47	30 1/2	1/4 to 3/8	+11	+54
1/2	53	42 1/2	1/2	21	7
5/8	58	47 1/2	3/4	28	13
1 to 1 1/2	60	49 1/2	1 to 1 1/2	30	14

Lap Weld, extra strong, plain ends

2	53	42 1/2	2	23	9
2 1/2 to 4	57	46 1/2	2 1/2 to 4	29	15
4 1/2 to 6	56	45 1/2	4 1/2 to 6	28	14
7 to 8	52	39 1/2	7 to 8	21	7
9 and 10	45	32 1/2	9 to 12	16	2
11 and 12	44	31 1/2			

To the large jobbing trade the above discounts are increased (on black) by one point, with supplementary discount of 5 per cent and (on galvanized) by 1 1/2 points, with supplementary discount of 5 per cent.

NOTE—The above discounts on steel pipe also apply at Lorain and Youngstown, Ohio, and Wheeling, W. Va. Chicago district mills have a base 2 points less. Chicago delivered base 2 1/2 points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point having the lowest rate to destination.

Boiler Tubes

(F.o.b. Pittsburgh)

Lap Welded Steel		*Charcoal Iron*	
2 to 2 1/4 in.	27	1 1/2 in.	+18
2 1/2 to 2 3/4 in.	37	1 3/4 to 1 7/8 in.	+ 8
3 in.	40	2 to 2 1/4 in.	— 2
3 1/4 to 3 3/4 in.	42 1/2	2 1/2 to 3 in.	— 7
4 to 13 in.	46	3 1/4 to 4 1/2 in.	— 9

Beyond the above discount, 5 fives extra are given on lap welded steel tubes and 2 tens on charcoal iron tubes.

Standard Commercial Seamless Boiler Tubes

Cold Drawn			
1 in.	55-58	3 and 3 1/4 in.	36-39
1 1/4 and 1 1/2 in.	47-50	3 1/2 and 3 3/4 in.	37-40
1 3/4 in.	31-34	4 in.	41-44
2 and 2 1/4 in.	22-25	4 1/2 in. and 5 in.	33-37
2 1/2 to 2 3/4 in.	32-35		

Hot Rolled			
3 and 3 1/4 in.	38-41	4 in.	43-46
3 1/2 in. and 3 3/4 in.	39-42		

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tube list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30 base .....85 to 87 per cent off list
Carbon 0.30 to 0.40 base .....83 to 85 per cent off list
Plus usual differentials and extra for cutting. Warehouse discounts range higher.

Seamless Locomotive and Superheater Tubes

	Cents per Ft.		Cents per Ft.
2-in. O.D. 12 gage	15	2 1/4-in. O.D. 10 gage	20
2-in. O.D. 11 gage	16	3-in. O.D. 7 gage	35
2-in. O.D. 10 gage	17	1 1/2-in. O.D. 9 gage	15
2 1/4-in. O.D. 12 gage	17	5 1/2-in. O.D. 9 gage	55
2 1/4-in. O.D. 11 gage	18	5 1/2-in. O.D. 9 gage	57

Prices of Iron and Steel Products and Raw Materials

Ores

Lake Superior Ores, Delivered Lower Lake Ports

Old range Bessemer, 55 per cent iron	$5.65
Old range non-Bessemer, 51½ per cent iron	4.90
Mesabi Bessemer, 55 per cent iron	5.40
Mesabi non-Bessemer, 51½ per cent iron	4.75

Foreign Ore, per Unit, c.i.f. Philadelphia or Baltimore

Iron ore, low phos., copper free, 55 to 58 per cent iron in dry Spanish or Algerian	9.00c. to 9.50c.
Iron ore, Swedish, average 66 per cent iron	9.50c.
Manganese ore, washed, 51 per cent manganese, from the Caucusus, nominal	42c.
Manganese ore, ordinary, 48 per cent manganese from the Caucasus	40c.
Manganese ore, Brazilian or Indian, nominal	42c.
Tungsten ore, high grade, per unit, in 60 per cent concentrates	$8.75 to $9.00
Chrome ore, basic, 48 per cent Cr_2O_3, crude, per ton, c.i.f., Atlantic seaboard	18.50 to 24.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	80c.

Coke and Coal

(Per Net Ton)

Furnace coke, f.o.b. Connellsville prompt	$3.50 to $3.75
Foundry coke, f.o.b. Connellsville prompt	4.25 to 5.00
Mine run steam coal, f.o.b. W. Pa. mines	1.50 to 2.10
Mine run coking coal, f.o.b. W. Pa. mines	1.75 to 1.90
Mine run gas coal, f.o.b. W. Pa. mines	2.25
Steam slack, f.o.b. W. Pa. mines	1.15 to 1.25
Gas slack, f.o.b. W. Pa. mines	1.25 to 1.35

Ferroalloys

Ferromanganese, domestic, 80 per cent, furnace, or seaboard, per ton	$115.00
Ferromanganese, foreign, 80 per cent, f.o.b. Atlantic port, duty paid	115.00
Ferrosilicon, 50 per cent, delivered	$2.50 to $5.00
Ferrosilicon, 75 per cent	145.00 to 147.50
Ferrotungsten, per lb. contained metal	90c. to 95c.
Ferrochromium, 4 per cent carbon and up, 60 to 70 per cent Cr., per lb. contained Cr. delivered	11.50c.
Ferrovanadium, per lb. contained vanadium	$3.50 to $4.00
Ferrocarbontitanium, 15 to 18 per cent, per net ton	200.00

Spiegeleisen, Bessemer Ferrosilicon and Silvery Iron

(Per gross ton furnace unless otherwise stated)

Spiegeleisen, domestic, 19 to 21 per cent	$33.00
Spiegeleisen, domestic, 16 to 19 per cent	32.00

Ferrosilicon, Bessemer, 10 per cent, $39.50; 11 per cent, $42; 12 per cent, $44.50; electric furnace ferrosilicon 10 to 11 per cent, $38; furnace, with an advance of $1 per unit for material above 10 per cent.

Silvery iron, 5 per cent, $27.00; 6 per cent, $28.00; 7 per cent, $29.00; 8 per cent, $30.50; 9 per cent, $32.50; 10 per cent, $34.50; 11 per cent, $37.00; 12 per cent, $39.50.

Fluxes and Refractories

Fluorspar, 80 per cent and over calcium fluoride, not over 5 per cent silica, per net ton, f.o.b. Illinois and Kentucky mines	$20.00
Fluorspar, 85 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines	21.00
Fluorspar, foreign, 85 per cent calcium fluoride, not over 5 per cent silica, c.i.f. Philadelphia, duty paid, per net ton	18.00

Per 1000 f.o.b. works:

Fire Clay	High Duty	Moderate Duty
Pennsylvania	$43.00 to $46.00	$40.00 to $43.00
Maryland	48.00 to 50.00	43.00 to 45.00
Ohio	43.00 to 46.00	40.00 to 43.00
Kentucky	43.00 to 45.00	40.00 to 43.00
Illinois	43.00 to 45.00	40.00 to 43.00
Missouri	45.00 to 48.00	38.00 to 43.00
Ground fire clay, per ton	6.50 to 7.50	
Silica Brick:		
Pennsylvania		40.00
Chicago		49.00
Birmingham		54.00
Silica clay, per ton	8.00 to 9.00	
Magnesite Brick:		
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.)		65.00
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.)		40.00
Chrome Brick:		
Standard size, per net ton		48.00

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland and Chicago)

Machine bolts, small rolled threads	60 and 10 per cent off list
Machine bolts, all sizes, cut threads	50, 10 and 10 per cent off list
Carriage bolts, smaller and shorter, rolled threads	50, 10 and 10 per cent off list
Carriage bolts, cut threads, all sizes	50 and 10 per cent off list
Eagle carriage bolts	65 and 10 per cent off list
Lag bolts	60, 10 and 10 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads	50 and 10 per cent off list
Other style heads	20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in.	45, 10 and 5 per cent off list
Larger and longer sizes	45, 10 and 5 per cent off list
Hot-pressed nuts, blank or tapped, square	4c. off list
Hot-pressed nuts, blank or tapped, hexagons	4.40c. off list
C.p.c. and t. square or hex. nuts, blank or tapped	4.10c. off list
Semi-finished hex. nuts.:	
⅞ in. and smaller, U. S. S.	80, 10 and 5 per cent off list
⅞ in. and larger, U. S. S.	75, 10 and 5 per cent off list
Small sizes, S. A. E.	80, 10, 10 and 5 per cent off list
S. A. E., ⅝ in. and larger	75, 10, 10 and 5 per cent off list
Stove bolts in packages	80 and 5 per cent off list
Stove bolts in bulk	80 and 5 and 2½ per cent off list
Tire bolts	50, 10 and 5 per cent off list
Bolt ends with hot pressed nuts	50, 10 and 10 per cent off list
Bolt ends with cold pressed nuts	45, 10 and 5 per cent off list
Washers*	6c. to 5.50c. off list

*F.o.b. Chicago and Pittsburgh

Semi-Finished Castellated and Slotted Nuts

(Prices delivered within specified territories)

(To jobbers and consumers in large quantities)

	Per 100 Net S. A. E.	Per 100 Net U. S. S.		Per 100 Net S. A. E.	Per 100 Net U. S. S.
¼-in.	$0.44	$0.44	⅝-in.	$2.35	$2.40
5/16-in.	.515	.515	⅞-in.	3.60	3.60
⅜-in.	.62	.66	1-in.	5.55	5.80
7/16-in.	.79	.90	1⅛-in.	8.90	8.90
½-in.	1.01	1.05	1¼-in.	12.60	13.10
9/16-in.	1.38	1.42	1⅜-in.	18.35	18.35
⅝-in.	1.70	1.73	1½-in.	21.00	21.00

Larger sizes—Prices on application.

Cap and Set Screws

(Freight allowed within zone limits)

Milled cap screws	80, 10 and 5 per cent off list
Milled standard set screws, case hardened	80 and 10 per cent off list
Milled headless set screws, cut thread	80 and 10 per cent off list
Upset hex. head cap screws, U. S. S. thread	8, 10, 10 and 5 per cent off list
Upset hex. cap screws, S. A. E. thread	8, 10, 10 and 5 per cent off list
Upset set screws	80, 10 and 10 per cent off list
Milled studs	75 per cent off list

Semi-Finished Steel, f.o.b. Pittsburgh or Youngstown, per gross ton

Rolling billets, 4-in. and over	$37.00 to $38.00
Forging billets, ordinary carbon	42.50 to 45.00
Sheet bars	38.00
Slabs	37.00 to 38.00
*Wire rods, common soft, base, No. 5 to ⅜-in.	48.00 to 50.00
Wire rods, common soft, coarser than ⅜-in.	$2.50 over base
Wire rods, screw stock	$5.00 per ton over base
Wire rods, carbon 0.20 to 0.40	3.00 per ton over base
Wire rods, carbon 0.41 to 0.55	5.00 per ton over base
Wire rods, carbon 0.56 to 0.75	7.50 per ton over base
Wire rods, carbon over 0.75	10.00 per ton over base
Wire rods, acid	15.00 per ton over base
Skelp, grooved, per lb.	2.10c.
Skelp, sheared, per lb.	2.10c.
Skelp, universal, per lb.	2.10c.

*Chicago mill base is $50 to $52. Cleveland mill base, $48 to $50.

Alloy Steel

(F.o.b. Pittsburgh or mill)

S. A. E. Series Numbers	Bars 100 lb.
2100* (1¼% Nickel, 10 to 20 per cent Carbon)	$3.00 to $3.25
2300 (3½% Nickel)	4.75
2500 (5% Nickel)	6.25 to 6.50
3100 (Nickel Chromium)	3.65
3200 (Nickel Chromium)	5.50
3300 (Nickel Chromium)	7.50 to 7.75
3400 (Nickel Chromium)	6.50 to 6.75
5100 (Chromium Steel)	3.50
5200* (Chromium Steel)	7.50 to 8.00
6100 (Chromium Vanadium bars)	4.25
6100 (Chromium Vanadium spring steel)	4.25
9250 (Silicon Manganese spring steel)	3.50
Carbon Vanadium (0.45 to 0.55 Carbon, 0.15 Vanadium)	4c.
Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chromium, 0.15 Vanadium)	4.50
Chromium Molybdenum bars (0.80—1.10 Chromium, 0.25—0.40 Molybdenum)	4.35
Chromium Molybdenum bars (0.50—0.70 Chromium, 0.15—0.25 Molybdenum)	3.75
Chromium Molybdenum spring steel (1—1.25 Chromium, 0.30—0.50 Molybdenum)	4.75 to 5.00

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for coal drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10-in. the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4-in. down to and including 2½-in. squares, the price is $5 a gross ton above the 4 x 4 billet price.

*Not S.A.E. specifications, but numbered by manufacturers to conform to S. A. E. system.

PERSONAL

J. E. McDonald, who has been resident editor of THE IRON AGE at Cincinnati for several years, has resigned. He leaves with the best wishes of THE IRON AGE. Burnham Finney has been appointed to the position. He is a graduate of the University of Cincinnati and has represented various business papers in that territory for a number of years.

H. F. Welch, who has been manager of sales to railroads in the New York district for the Niles-Bement-Pond Co., 111 Broadway, New York, has been appointed New York district sales manager. W. P. Kirk, formerly of the company's Cincinnati office, is now assistant general sales manager under E. L. Leeds, general manager of sales. Elmer Gates of the Rochester office has been transferred to the Cincinnati district office succeeding Mr. Kirk.

Henry Wysor has been appointed director of research of the Lehigh division of the Bethlehem plant, Bethlehem Steel Co. He is a graduate of Virginia Polytechnic Institute, and from 1901 to 1904 was with the Duquesne works of Carnegie Steel Co., where he was engaged in the laboratory, blast furnace and open-hearth departments. In 1904 he became assistant professor of analytical chemistry in Lafayette College and later professor of metallurgy. In 1918 he resigned to join the Bethlehem organization, with which for the past six years he has been associated in the metallurgical division, specializing in steel and field research work, particularly in the alloy products.

Melvin F. Findley, who has been district sales manager at Chicago during the past nine years for the West Leechburg Steel Co., Pittsburgh, has been transferred to Detroit as district sales manager. He succeeds Austin J. Artman, who has been transferred to Cleveland after having served nine years as Detroit sales manager. L. W. Briggs, who has been assistant district sales manager in Chicago, has been named to succeed Mr. Findley there and R. J. Swan has been transferred from the company's Pittsburgh office to Chicago to become assistant to Mr. Briggs.

Frank Collins, purchasing agent and office manager of the Taylor-Fichter Steel Construction Co., 132 West Forty-second Street, New York, has resigned to become a partner in the business of the Gregory Ferend Co., 154 Nassau Street, New York, contractor on structural steel and tank painting. Mr. Collins was with the Taylor-Fichter company for about three years.

Phillip B. Marsden, Worcester, Mass., has been elected to succeed the late John Wheeldon as president of the Wheeldon Wire Co., West Brookfield, Mass., while Clarence S. Arms takes Mr. Wheeldon's place as general manager, adding the office to that of vice-president which he previously held. Charles S. Sparrell continues as treasurer.

Howard W. Dunbar, assistant general sales manager of the Norton Co., Worcester, Mass., has returned from a two months' business trip for the company in Cuba, where he made a study of conditions as affecting demand for grinding wheels and grinding machines.

Ralph R. Weddell is now chief engineer for the O. K. Tool Co. at Shelton, Conn.

Albert E. Garnjost, recently appointed manager of the Los Angeles, Cal., office of A. B. Ambler, and who will supervise sales in the district for the Alan Wood Iron & Steel Co., Philadelphia, and the Columbia Steel & Shafting Co., Pittsburgh, formerly was with the Berger & Carter Co., San Francisco, which was acquired by A. M. Castle & Co., Chicago.

F. P. Truesdale has resigned as secretary of the G. H. Snowden Co., Pittsburgh, to become manager of the coal and coke department of Hickman, Williams & Co., with headquarters in the company's Pittsburgh office.

George F. Scott has been appointed purchasing agent of the American Radiator Co., Buffalo, effective Feb. 16. He has had many years' service with the Radiator company in various capacities.

Herbert Theurlich has been appointed Milwaukee sales representative for the Marshall & Huschart Machinery Co., Chicago.

Edwin H. Peirce, superintendent American Steel & Wire Co., New Haven, Conn., has been made superintendent of the South Works, Worcester, Mass., plant. Malcolm W. Reed has been made superintendent of the New Haven plant.

Perry W. Rice, for three and one-half years manager of the Chicago branch of the Pratt & Whitney Co., and for the past two years with the Hendey Machine Co. at Torrington, Conn., has been transferred to the Chicago sales office of the latter company.

Henry D. Sharpe, president Browne & Sharpe Mfg. Co., Providence, R. I., has been elected a director of the Chamber of Commerce of the United States. He was put on the chamber directorate to serve out the unexpired term of Edgar W. Hearty, of New York, resigned.

C. L. Miller, vice-president American Steel & Wire Co., Pittsburgh, whose health has been somewhat impaired, is gaining steadily in strength and he expects soon to be able to return to business.

Lynn W. Nones has been appointed eastern sales manager for the Diamond Power Specialty Corporation, in charge of the Atlantic Coast offices from Boston to Charlotte, N. C., inclusive. His office is at 90 West Street, New York.

H. W. Brooks, fuel engineer for the U. S. Bureau of Mines in Pittsburgh, has resigned to join the consulting staff of the Fuller-Lehigh Co., Fullerton, Pa., where he will specialize in the pulverized-fuel field.

OBITUARY

WILLIAM M. LAWYER, president E-Z Car Control Co., Syracuse, N. Y., manufacturer of safety air brakes and equipment for street cars, died at his home in that city Feb. 20, following a stroke of paralysis. He was 50 years of age. He formerly engaged in the manufacture and distribution of railroad supplies. In 1922 he incorporated the Turnstile Car Corporation, Syracuse, of which he was president and treasurer at the time of his death.

RANDOLPH MARTIN GOLDSBOROUGH, long identified with the oil well pipe and supplies business, and who had an extensive acquaintance in the steel industry, died suddenly at Best, Tex., Feb. 19. He was born at Parkers Landing, Pa., 51 years ago. He joined the Oil Well Supply Co., Pittsburgh, in 1891, and was associated with that company until 1910, when he resigned to go with the Union Tool Co., first at Los Angeles, and later at Chicago. In 1920 he returned to Pittsburgh and established the Titusville Supply Co., with which he was identified until about six weeks ago, when he became vice-president and general manager of the International Supply Co., Tulsa, Okla. He was on a visit to the stores of the company when he was stricken.

EDWARD RUSSELL BARBOUR, one of New England's veteran mill and railroad supply dealers, died Monday, Feb. 16, at Portland, Me. He was 80 years old and had retired from business in 1907. Since then he had spent his winters in Boston and summers in Scarboro, Me.

ALBERT F. ROCKWELL died at the New Britain, Conn., General Hospital on Monday night, Feb. 16, in his sixty-fourth year, following an operation. He was the founder of the New Departure Co., Bristol, Conn., and the Bristol Brass Mfg. Co., as well as several other companies. During the war he purchased the Marlin Firearms Co., New Haven, Conn.

BOOK REVIEWS

Commerce Year Book, 1923. Pages 722 + xii. 146 diagrams and numerous tables. Published, 1924, by Government Printing Office, Washington. Price, 85c.

This is the second issue of a book which lies somewhat between the annual "Statistical Abstract of the United States" and the annual report of the Secretary of Commerce. It presents an authoritative review of the economic year throughout the world, prepared from the point of view of American industry and commerce. It carries a wealth of general economic information, with comparative figures for a period of years preceding that for which the reports are made.

Among the many subjects covered in considerable detail are the following: Production, employment and domestic trade; wholesale and retail prices; agricultural products and foodstuffs; fuel and power; metals; construction materials; construction; machinery and equipment; textiles and clothing; leather and its products; paper and printing; automotive products; rubber and its products; chemicals; transportation and communication; finance and banking; foreign trade; and economic reviews and statistical data of a large number of foreign countries. A comprehensive index closes the volume.

Iron and steel are covered in the section devoted to metals. Production, stocks, unfilled orders, exports and imports for a series of years are tabulated, with monthly figures for the year under review. Census Bureau reports of blast furnace and steel works and rolling mill operations are given, together with world production of iron and steel in 1913 and in the years since the war. Iron ore, pig iron, steel ingots and the principal rolled steel products are subject to separate survey. Prices constitute a second portion of this division, while the foreign trade is given elaborate attention.

Non-ferrous metals are treated in about the same manner as the iron and steel products, with special attention to copper, lead, zinc, aluminum and tin.

Manchuria: Land of Opportunities. Pages 98; illustrations, 102 from photographs and one colored map. Published 1924 by South Manchuria Railway Co., New York.

While frankly propaganda designed to increase the railroad's business, this book is most entertainingly written and beautifully put together. It is the revision of an earlier work dealing with the development of a territory of 365,000 square miles and with a population estimated now at 25,000,000. This is a population almost as great as that of New England, New York, New Jersey and Pennsylvania combined, and with an area twice that of those nine States. The development during the past 20 years has been so great that Dairen, the principal port, has been transformed from a fishing village into a city of 250,000 people, and its overseas traffic to a point where it is second only to Shanghai of all the ports on the mainland of Eastern Asia.

Much is said in the book about the development of agriculture and industry throughout the whole region affected. In this development the railroad has exercised a large share, particularly in connection with its experimental stations for agricultural and chemical development, and its fathering of infant industries until, having attained maturity, they have been turned over to commercial companies to operate. Among the important industrial enterprises along the lines of the railroad are the iron mines and steel works at Anshan and the iron mines at Penhsihu, which were described in some detail in THE IRON AGE of Aug. 23 and Aug. 30, 1923, at pages 461 and 534. The construction at Anshan was begun in 1917 and two blast furnaces of 350 tons per day each were completed in 1918 and 1920.

Throughout the book statistical comparisons are made, covering in each case a period of years and relating both to production and to shipments, as well as to financial matters. A turning of the pages, with examination of these figures, gives the reader an impression of an immensely virile development program carried out with great success.

An elaborate daily calendar pad, which may be termed an illustrated technical historical calendar for 1925, has been published by R. Oldenbourg, München, Germany. The sheet of each day, 5 x 9½ in. in size, contains an illustration of technical interest, the anniversary record of the birth or death of a notable personality in technology, or invention or of an occurrence of importance, and an appropriate German quotation. The compilation, which is all in German, is the work of Dr.-Ing. Franz Maria Feldhaus.

Moderate Increase in Production in the Mahoning Valley

YOUNGSTOWN, Feb. 24.—Schedules of Mahoning Valley iron and steel properties show response this week to some improvement in specifications, affecting semi-finished and finished steel lines. Sheet makers who recently curtailed to a five-day week basis are restoring operations to a normal week. The Youngstown Sheet & Tube Co. is operating in the Youngstown district 27 of 30 sheet mills, its best record in several months. The Republic Iron & Steel Co. has added two open-hearth furnaces, for a total of 10, and has enlarged active merchant steel bar and plate capacity. This company's 14-16 in. bar mill is again in action, following a temporary suspension. The Trumbull Steel Co. has enlarged the operating rate of its sheet mill department to an approximately normal basis.

Steel ingot output in the district averages 80 per cent, against a recent low of 70 per cent. The Republic company is producing steel ingots at 70 per cent, the Sheet & Tube company at 80 per cent, and other interests at a near-capacity rate.

Of 67 open-hearth furnaces in the district, including the Steel Corporation units, 52 are melting. Of this number, 39 are independently operated furnaces. The number of active independent open hearths is nine less than the recent peak rate, but four more than two weeks ago.

Of 139 independent and Steel Corporation subsidiary sheet mills, 119 are rolling, including 109 independent units. This is within one mill of the recent peak operation of independent sheet mills.

At its Farrell, Pa., works, the American Sheet & Tin Plate Co. started this week, for the first time in over a year, all 30 tin mills.

The American Puddled Iron Corporation is operating two of four mechanical puddlers at its plant in Warren.

Operations of the Sheet & Tube company average 85 per cent., and of the Republic company 82 per cent.

The iron and steel industry has liberal representation in the directorate of the West Virginia Manufacturers Association, the following having been elected directors at the annual meeting of the organization, held in Wheeling, W. Va., Feb. 20: W. H. Abbott, vice-president in charge of sales, Wheeling Steel Corporation, Wheeling; Herbert E. Field, president, Wheeling Mold & Foundry Co., Wheeling; Fred Helmick, president, Helmick Foundry & Machine Co., Fairmont; A. S. Shoffstall, International Nickel Co., Huntington; W. C. Kelly, president, Kelly Axe & Tool Co., Charleston; R. C. Kirk, vice-president, Follansbee Bros. Co., Follansbee; C. F. Niemann, president, Parkersburg Iron & Steel Co., Parkersburg; J. M. Sanders, United States Stamping Co., Moundsville; Isaac M. Scott, president Wheeling Steel Corporation; D. M. Weir, vice-president Weirton Steel Co., Weirton, and H. A. Zeller, West Virginia Rail Co., Huntington.

JANUARY STRUCTURAL SALES

Sharp Drop from December and Shows Effect of Year-End Rush

WASHINGTON, Feb. 24.—The Department of Commerce announces sales of fabricated structural steel for January as 57 per cent of capacity, based on total bookings of 141,719 tons reported by fabricators with a capacity of 247,535 tons per month, as against December bookings of 80 per cent of capacity. Shipments of fabricated structural steel in January represented 60 per cent of the capacity of firms reporting this item, as against 63 per cent in December and 63 per cent a year ago.

The table below lists the statistics reported by 190 identical firms, reduced by consolidation from 192, with a present capacity of 252,440 tons per month, comparing with 250,790 in 1923 and 242,465 in 1922. For comparative purposes, the percentage figures are used to obtain a computed total for the United States, based on a capacity of 285,000 tons per month in 1923 and 290,000 in 1924 and 1925.

1923	Actual Tonnage	Per Cent of Capacity	Computed Tonnage
January	179,089	71	202,350
February	192,795	77	219,450
March	230,367	92	262,200
April	194,250	77	219,450
May	138,869	55	156,750
June	126,299	50	142,500
July	125,385	50	142,500
August	143,979	57	162,450
September	130,199	52	148,200
October	122,583	49	139,650
November	133,065	54	153,900
December	196,055	79	225,150
1924			
January	176,531	70	203,000
February	180,397	72	208,800
March	174,254	69	200,100
April	160,389	64	185,600
May	146,036	58	168,200
June	162,010	64	185,600
July	170,868	68	197,200
August	147,439	58	168,200
September	165,913	66	191,400
October	[1] 161,454	64	185,600
November	[2] 207,047	82	237,800
December	[3] 198,778	80	232,000
1925			
January	141,719	57	165,300

[1] Reported by 187 firms with a capacity of 251,030 tons.
[2] Reported by 187 firms with a capacity of 251,090 tons.
[3] Reported by 183 firms with a capacity of 247,340 tons.

Week's Awards More Than 40,000 Tons, Including Several Large Projects

Reports of structural steel awards in the past week bring the total to well over 40,000 tons, made up of a good percentage of large tonnage projects. One of the largest of these was the 7000 tons for car shops placed by the city of New York and the 8300 tons for New York subways. Another large award was the steel for the new Madison Square Garden totaling close to 4000 tons. In pending business which, according to reports, runs well over 35,000 tons, the outstanding inquiry is the 14,000 tons for the Philadelphia subway. Another large project is a vehicular tunnel between the cities of Oakland and Alameda, Cal., which will require about 5000 tons of structural steel, unless reinforced concrete construction is decided upon. Awards include:

City of New York, Board of Transportation, Coney Island shops, 7000 tons, to Bethlehem Steel Co.

James Stewart & Co., New York, new Madison Square Garden, Fiftieth Street and Eighth Avenue, New York, 4000 tons, to Taylor-Fichter Steel Construction Co.

Master Craftsmen building, Flushing, N. Y., 750 tons, to Shoemaker Bridge Co.

City of New York, two sections of St. Nicholas Avenue subway, 8300 tons, to American Bridge Co.

Jamaica high school, Jamaica, L. I., 4000 tons, Lustbader Construction Co., New York, low bidder for contract.

Apartment house, 912 Fifth Avenue, New York, 1000 tons, to Taylor-Fichter Steel Construction Co.

O'Day Construction Co., contractor on Pier No. 2, Hudson River, 900 tons, to Harris Structural Steel Co.

Frazer Paper Mill, Madawaska, Me., 600 tons, to McClintic-Marshall Co.

Rochester Gas & Electric Co., Rochester, N. Y., 1000 tons, to Bethlehem Fabricators, Inc.

Rochester Chamber of Commerce, Rochester, N. Y., new building, 700 tons, F. L. Heughes.

Kibler high school, North Tonawanda, 350 tons, to Bethlehem Fabricators, Inc.

Plastergon Wall Board Co., Buffalo, 250 tons, to Pittsburgh Bridge Co.

R. S. McMannus Steel Construction Co., Buffalo, will fabricate the 100 tons of steel for its addition.

Cicero, Ill., hotel, 2500 tons, to American Bridge Co.

R. S. Sterling, Houston, Tex., office building, 2136 tons, to Pennsylvania Car Co.

Y. M. C. A. Hotel, annex, 822 South Wabash Avenue, Chicago, 1481 tons, to American Bridge Co.

Merchants National Bank, Cedar Rapids, Iowa, 1200 tons, to Iowa Steel & Iron Co.

Great Lakes Dredge & Dock Co., two barges, 1200 tons, to Manitowoc Shipbuilding Co.

Seaman Body Corporation, Milwaukee, 1000 tons, to Worden-Allen Co.

Lubliner & Trinz, theater and apartment building, Lincoln Avenue near Belmont Avenue, Chicago, 1093 tons, to A. Bolter's Sons Co.

Commissioners of Port of New Orleans, wharf, 560 tons, to Rochester Bridge Co.

Puyallup River bridge, near Puyallup, Wash., 378 tons, to Virginia Bridge & Iron Co.

Y. M. C. A., three buildings, Houston and Ninety-first Streets, Irving Park Boulevard and Kildare Avenue, 111th Street and Wabash Avenue, Chicago, 300 tons, to American Bridge Co.

South Chicago Savings Bank, South Chicago, 150 tons, to American Bridge Co.

Pickands, Mather & Co., Duluth, Minn., ore crushing plant for Scranton mine, Hibbing, Minn., 192 tons, to Lakeside Bridge & Steel Co.

Berryhill Malleable Iron Co., Evansville, Ind., 210 tons, to A. C. Woods Co., Rockford, Ill.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

Harriman National Bank, New York, new building on Fifth Avenue, 700 tons.

Saxton, Pa., power plant, 500 tons.

City of Philadelphia, Broad Street subway, Section No. 3, 14,000 tons, bids open March 17.

City of New York, inspection shed, Corona, L. I., 750 tons.

Consolidated Gas Co., New York, coal handling unit, Hunts Point, 1600 tons.

Cities of Oakland and Alameda, Cal., vehicular tunnel, bids asked on tonnage of reinforcing bars or 5000 tons of structural steel.

Federal Bank, Philadelphia, annex, 500 tons.

Alexandria, Va., hotel, 500 tons.

Cushman & Sons, New York, bakery at 517 West Fifty-ninth Street, 400 tons.

Morro Realty Co., New York, loft building, 135 West Thirty-sixth Street, 1400 tons.

Cornish Arms Hotel, 311 West Twenty-third Street, New York, 800 tons.

Yale University, New Haven, Conn., Osborn Hall, 200 tons.

Whellon, Utah, pipe line and power house, 1500 tons.

Loveland, Colo., pipe line, 1400 tons.

Chicago & North Western Railroad, bridge work, Milwaukee, 3000 tons.

Dillon building, Nashville, Tenn., 1000 tons.

Howard Street theater, Chicago, 950 tons, bids being taken, Rapp & Rapp, Chicago, architects.

Illinois Central, 5 deck plate girder spans, 440 tons.

Spring Wells, Mich., grade separations, 350 tons.

Sears, Roebuck & Co., warehouse, Kansas City, Mo., 300 tons.

In the iron and steel industry, more accidents occur at night than in the daytime, the percentages of each being 60 and 40, respectively, according to a five-year survey made by the Eye Sight Conservation Council of America. More workers are said to be killed in December, during which month daylight illumination is lowest, than in any other month of the year.

Blast Furnace and Open-Hearth Problems

(*Continued from page 620*)

the author, T. L. Joseph, metallurgist, North Central Station, Bureau of Mines, Minneapolis, Minn. This paper and the one on "Sulphur in Basic Open-Hearth Practice," presented at the other session, were both valuable additions to the discussion of the sulphur problem as it bears on the production of steel from the ore to the final product.

Taking as a basis the operating data of 35 blast furnaces, the author has made elaborate calculations of sulphur balances from these data and states that they indicate that approximately 92 per cent of the total sulphur charged enters with the coke, 7 per cent with the ore and 1 per cent with the limestone. Most of the sulphur is carried from the furnace by means of the slag, the total amount eliminated being the product of the slag volume and the percentage of sulphur it contains. The elimination of additional sulphur in the charge must be effected either by increasing the percentage of sulphur in the slag or by augmenting the slag volume or quantity of slag. Based upon relations established between slag volumes and coke consumption as well as sulphur in the coke and in the slag volume, the author has prepared curves showing the relative value of blast furnace coke as its sulphur varies either way from 1 per cent. In general, he states that high sulphur coke means the necessity of the presence of more slag and that this automatically calls for more fuel.

Discussion

Emphasizing the importance of this paper and characterizing it as one of the best of several contributions to discussions of the blast furnace operations presented by the Bureau of Mines, Mr. Sweetser pointed out that the subject treated is closely allied with a discussion of high manganese iron ores, with the problem of sulphur in coal mining operations, and with the general question of fuel consumption. It is important to the blast furnace, the open-hearth, the coke and the coal industries. He referred to some of his own experiments and observations whereby it had been established that lower sulphur coke means lower temperature of the iron and lower total carbon. He stressed the point that cooperation between the various phases of the industry above mentioned was essential to attain the best results.

Henry D. Hibbard called attention to the fact that there was also indirectly involved in this matter the relative proportions of pig iron and scrap which may be used in steel making. When pig iron is cheaper than scrap, more pig iron will be used, and vice versa.

That too much importance may possibly be placed upon the harmful effect of sulphur in pig iron, and finally in the steel, was alluded to by F. N. Speller, National Tube Co., Pittsburgh, citing as examples the fact that there have been several illustrations of no harm in the finished product where the sulphur is high, particularly in certain welding operations. This was especially true in the manufacture of some classes of tubing.

C. A. Meissner, United States Steel Corporation, who was chairman of the second part of the session held Wednesday afternoon, Feb. 18, said that care should be exercised as to what limits the results laid down in the paper take place. From the experiences of his own company no deleterious results had been observed in the various ranges of sulphur in coke up to 1 per cent. This applies particularly, he said, to the operation of the largest furnaces. Under such conditions coke consumption is uniform as well as the tonnage produced and there have been cases of record outputs with sulphur as high as 0.95 per cent, accompanied at the same time by low coke consumption. All calculations, such as those in the paper, involve certain limitations which may be more applicable and valuable to smaller furnaces.

Errors in Blast Furnace Records

Another paper on blast furnace operations dealt with the "Probable Error in Blast Furnace Records and Calculations," the author of which is T. T. Read, safety service director, Bureau of Mines, Washington.

Briefly, the paper discusses the point that "if it is assumed in blast furnace records and calculations that known quantities or factors are constant, when as a matter of fact they are variable, the effects of these variations may erroneously be ascribed to some other cause." Factors such as carbon content of the coke, moisture in coke and other materials, quantities of iron involved, the silica content of the ores, etc., are discussed in the light of the possible errors involved. In summarizing, the author said that it had been set forth in the paper that nearly every measuring operation involved in securing blast furnace records involves a possible error of 5 per cent, or more, and quantities that are commonly measured with greater accuracy than this have to be multiplied or divided by figures involving a possible error of 5 or 10 per cent. "It must not be inferred from the foregoing that, since blast furnace records showed determinations made with only as high a degree of commercial accuracy as practical considerations of expense permit, and must be interpreted in the light of the probable errors involved, that they are therefore not a valuable guide to operations."

Steel Direct from the Ore

The direct production of steel from iron ore was discussed in an interesting paper by Heihachi Kamura, metallurgist, Meiji Mining Co., Tobata-Shi, Fukuoka-Ken, Japan, entitled "Reduction of Iron Ores by Carbon Monoxide." This was presented in abstract by Prof. C. A. Roush, associate professor of metallurgy Lehigh University, Bethlehem, Pa.

Taking up various stages of this much discussed process, the author discusses first the proper temperature for the reduction of iron ores by this gas and then attempts to estimate whether there is any difference in the rate of reduction as effected by the sizes of ore under 4 mesh per linear in. No evidence, however, could be found. The rates of production on seven kinds of ore are compared with the results of the author's principal experiment and a close relation between reductability and density of ore was demonstrated. Finally the maximum size of ore that can be reduced in a definite length of time was determined.

Among the conclusions which the author arrives at are the following:

> The proper temperature for the reduction of iron ores by carbon monoxide gas depends on the physical properties and the chemical composition of the ore. It is about 900 deg. C. for limonite or hematite. In the case of magnetite or magnetite sands, slightly higher temperatures are needed.
>
> The difference in reducibility of the ores depends mostly upon their physical properties. The denser the ore the more difficult is the reducing action of gas as the diffusion of gas would be slower. Generally, the density of an ore will indicate its reducibility. The degree of crystallization of the ore also has much influence on the reducibility.
>
> The time for reduction will be determined by reducibility, size of ore and volume of CO gas passed. In these experiments nearly perfect reduction was obtained in from two to three hours on the 1-cm. size of ore, using the proper volume of gas.
>
> The reduction is easier the finer the ore but it is better that the ore have some size as the gas diffuses easily between the particles of the ore. In the experiments, reduction was tried on the ore up to 40-gm. pieces (1 by 1½ in.) The time required for the reduction was from 3½ to 5 hr. in the 1-in. size of ore and from 2 to 3 hr. for ore under ½ in. in size.

The application of the fundamental principles determined in the author's research work for the development of the direct process, demands a high degree of metallurgical and engineering talent, in the opinion of the author, and just because of the lack of these the direct process in the past has failed. But today the sum total of knowledge is greater and the amount of trained talent available for solving difficult metallurgical problems is incomparably greater than formerly and both knowledge and the quantity of available talent are increasing rapidly. The author believes that the

present process of the production of steel may be replaced by low temperature production of iron ores some time in the future.

Discussion

Discussion of the subject was not extended. Ralph H. Sweetser expressed his disagreement on many of the points made by the author, but agreed on one, namely, that it is a waste to put carbon in iron and then be obliged to remove it to make steel. Just how much carbon is necessary in pig iron for the production of open-hearth steel, for example, he had never heard stated, although statements are made as to the amount of sulphur, phosphorus, manganese, etc. Putting carbon into pig iron is, of course, done at the expense of fuel. In reference to this question, C. H. Herty explained that the amount of carbon necessary in pig iron for open-hearth steel depends upon the ratio of the amount of scrap to pig iron and also on the quantity of silicon, sulphur and phosphorus in the pig iron.

Manganiferous Iron Ores

Two papers on manganiferous iron ores were presented at one of the sessions. One was entitled "Manganiferous Iron Ores of the Cuyuna District, Minnesota" by Carl Japffe, geologist Northern Pacific Railway, Brainerd, Minn., and the other was entitled "Economics of the Cuyuna Manganiferous Iron Ores" by C. P. McCormack, mining engineer Crowell & Murray, Cleveland.

In the paper by Mr. Japffe, the two principal classes of the ore of that district are discussed, followed by production figures and chemical composition. The concluding part of the paper is devoted to a discussion of the reserves of ore and the future possibilities. In 10 years the manganiferous iron ores of the Cuyuna district have become an important factor in the iron industry. By the end of December, 1923, however, 4,735,000 tons had been produced. During the war the low phosphorus black ores were in demand, but at present the high phosphorus, low silica, brown ores are favored. The author estimates that the reserves of these ores are ample for some time to come.

In the second paper, the author states that these ores can be a principal source of manganese for the iron and steel industry in the United States, provided metallurgical methods as a whole are adjusted so as to use run-of-mine ore; that the use of manganese in steel-making is growing and that increasing amounts of impurities in raw materials call for more manganese, a constant cheap supply of which is wanted. The same two classes of ore mentioned in the other paper are discussed by the author, and the amount of manganese available is figured. Assuming that 13 lb. of manganese are required per ton of basic steel, and that 25 per cent of this can be supplied by these ores, the quantity of metallic manganese estimated as available would supply the industry for 30 years at an annual steel production of 40,000,000 tons. The author discusses the function of manganese and the adaptability of these ores in general. He believes that metallurgical developments will open new uses for such ores of which the supply is ample.

Discussion

The importance of this subject was testified to by C. P. Perin, Perin & Marshall, New York, who pointed out that the British Empire is considering the placing of a limit on the use of raw materials located within its confines which directly affects the manganese question in that most of the supply for the American steel industry comes from India and Brazil. Should that nation adopt such a policy the consequences would be of considerable importance to the American steel industry. So far as the Russian supply is concerned, the securing of material from that source is now, and may be for some time, fraught with difficulty. In his opinion, we must sooner or later look to the Cuyuna supplies of manganiferous ores, with no fear as to our ultimate ability to beneficiate them.

Non-Ferrous Sessions

All the sessions of the Institute of Metals Division were attended by large and enthusiastic audiences. The presence of several prominent research metallurgists in this field was a feature, particularly Dr. Carl Benedicks of Sweden, who took an important part in the discussions. For the three sessions a group of interesting papers was scheduled and presented.

Stronger Aluminum Alloys

An outstanding contribution on aluminum alloys was the feature of the first session on Monday morning, Feb. 16, presided over by George K. Elliott, chief metallurgist, Lunkenheimer Co., Cincinnati. It was a paper by Robert S. Archer and Dr. Zay Jeffries, of the Aluminum Co. of America, Cleveland, entitled, "New Developments in High Strength Aluminum Alloys." The authors presented the results of work done in the laboratories of the Aluminum Co. of America with the object of developing an alloy having at least the excellent physical properties of duralumin, and in addition better fabricating properties. The result of their work has been the perfection of two new alloys of striking properties. An abstract on other pages gives some of the principal results of the author's work.

A comprehensive abstract of the work done was presented by Mr. Archer, accompanied by slides which amplified some of the work not included in the paper, particularly some explanation of the theory and mechanism of the unusual hardening properties of these alloys. There was very little discussion following the presentation of the paper, but Dr. Jeffries, who was present, answered one or two questions. As to the rôle of manganese in duralumin, he stated that this metal acts mainly to harden the matrix and, after quenching, it increases the tensile strength. The precipitation of the compounds in the various alloys which takes place on natural or artificial aging adds to the hardness of the matrix.

Hardness of Cold-Rolled Metals

The question of the "Scratch and Brinell Hardness of Severely Cold-Rolled Metals" was discussed in a paper by Dr. M. F. Fogler and E. J. Quinn, development laboratories of the Hawthorne Works of the Western Electric Co., Chicago. The paper is an attempt to duplicate the work of Henry S. Rawdon and an associate, of the Bureau of Standards, Washington, whose experiments given in a paper before the Institute last year showed that on continued cold rolling the metal hardened up to a particular point and then reversed and became softer.

The work of the present paper did not confirm their results. The authors said that the Brinell results for both copper and iron show an increase in hardness on cold rolling, up to a certain point when the Brinell member becomes constant. The only place where a slight decrease is indicated is in the thinnest samples. The data for scratch hardness indicate that on cold work this hardness increases slightly up to a certain point and then remains constant, although this increase in hardness is not of the same magnitude as that of the Brinell. These results, say the authors, indicate that a reversal of the hardness, as found by Rawdon, does not occur under all conditions of commercial rolling practice and, in view of the fact that previous investigators have not found such a reversal it seems not improbable that it might be characteristic of the particular rolling conditions prevailing in the previous experiments.

Malleability of Nickel

The results of some interesting work on "The Malleability of Nickel" was presented by Dr. Paul D. Merica and R. G. Waltenberg, of the International Nickel Co., New York. While pure nickel is itself non-malleable, because of the presence of sulphur, the paper shows the effect of a small amount of manganese and of magnesium in overcoming this harmful effect and rendering the metal malleable. Preliminary information on this investigation was made public recently by the Bureau of Standards.

Some of the other papers presented at the various

sessions were "The Determination of Structural Composition of Alloys by a Metallographic Planimeter" by E. P. Polushkin, instructor in metallurgy Columbia University, New York; "Corrosion of Copper Alloys in Sea Water," by William H. Bassett, technical superintendent and metallurgist, and C. H. Davis, assistant metallurgist, American Brass Co., Waterbury, Conn., and "Tantalum, Tungsten and Molybdenum," by E. W. Engle, Fansteel Products Co., North Chicago, Ill.

Annual Non-Ferrous Lecture

Four years ago the plan was inaugurated by the Institute of Metals Division for an address each year as a feature of the February meeting. According to the original plan, on alternate years some distinguished scientist from abroad should deliver this address. Two years ago the second lecture was given by Dr. Walter Rosenhain, of the National Physical Laboratory, Teddington, England, and this year Dr. Carl Benedicks was selected. Former lecturers have been two Americans, Dr. W. D. Bancroft of Cornell University, and Dr. Zay Jeffries of Cleveland. A brief abstract of this year's lecture is given below.

Dr. Benedicks, director of the metallographic institute at Stockholm, Sweden, is one of Europe's celebrated metallurgists. His contributions have been many and important. One of his first dealt with the physics and chemical physics of carbon steel and is still considered a standard work on that subject. He has made several contributions to the subject of quenching media and thermocouples which are considered classics. Dr. Benedicks has in recent years been the recipient of several awards abroad in recognition of his work in metallographic and allied subjects. In 1908 he received the Carnegie scholarship and gold medal of the Iron and Steel Institute at London and was appointed the May lecturer in thermoelectricity at the Institute of Metals in London in 1918. In 1922 he received the Prix Henry Will, at the Academie des Sciences at Paris. In the same year he was made honorary vice-president at the Iron and Steel Institute at London, and last year was made a member of the Royal Academy of Sciences at Stockholm. His first visit to this country was in 1909, but the present one is the first one which will embrace an extended tour. He will deliver lectures before various universities and chapters of the American Society for Steel Treating from the Atlantic to the Pacific Coast during the next two months.

Corrosion of Condenser Tubes

Dr. Benedicks, taking as his subject "The Corrosion of Condenser Tubes," recounted briefly the principal facts known about the formation of deep pits in condenser and boiler tubes made of brass and steel. These dissimilar metals are subject to failure in the same manner, from some cause known to be independent of the chemical and physical condition of the metal, but which is always prevented if the water is freed from all its dissolved air by suitable means.

Dr. Benedicks advanced the idea that pits are located in a fortuitous manner, wherever air bubbles attach themselves to the boiler tubes. Under these air bubbles corrosion proceeds with comparatively great rapidity, due to the presence of moist air locally overheated by the insulating action of the air bubble itself. Air separates from a water solution on a hot wall of this sort in conformity with the same principle that a mirror clouds over in a bathroom. In the latter instance water separates from an air solution on a cold wall. The lecturer gave a general statement of this so-called "hot-wall effect" and described experiments by which he was able to produce deep pits under air bubbles attaching themselves to thin nichrome ribbon heated by a current of electricity while immersed in water saturated with air.

Obviously the way to prevent pitting is to use de-aerated water, a practical dodge well known to engineers. Dr. Benedicks proposes to accomplish this by introducing a series of electrically heated coils of resistance wire into the supply pipes and draining off the air which bubbles up from these hot wires into suitable domes. He finds that it is possible to de-aerate water completely by three such coils. Such a scheme, which is attractive because it utilizes the cause of pitting to effect the cure, is particularly applicable for rendering boiler feed water free from dissolved air.

In order to illustrate other places where this "hot wall effect" is to be reckoned with in metallurgy, Dr. Benedicks referred to some apparently analogous instances of segregation in ingots. According to the iron-carbon diagram, the first metal to solidify in steel and most cast irons contains less carbon than the still liquid mass. Several large ingots have been investigated carefully, and the results of some have been published, wherein the surface layers and bottom region have *more* carbon than the general average. That this is not due to a carbonaceous mold wash is proven by the fact that the same differential exists in the phosphorus content.

Dr. Benedicks advances the idea that the "hot wall effect" is responsible; in large ingots poured with quiet metal and freezing slowly, the tendency of the solute to concentrate in the cooler part of the liquid will more than counteract the differences due to selective freezing of solid solutions.

It is also possible that the "hot wall effect" may be responsible for the differences in chemical composition in intrusions of volcanic rock which have been puzzling geologists. Undoubtedly in the solidification of the earth as a whole this physical principle had ample opportunity to be developed on a grand scale. Time and temperature differences were maximum!

In closing, Dr. Benedicks observed that some of his remarks, while perhaps far afield from non-ferrous metallurgy, were made in order to indicate briefly how the same principle was effective in forming a stellar system and in pitting a condenser tube. Science is universal. Furthermore, "pure" science can be developed to its fullest extent only by applications to work-a-day problems—and vice versa.

The New President

J. V. W. Reynders, the institute's new president, was graduated from Rennselaer Polytechnic Institute in 1886. He began the manufacture of steel at Pittsburgh in the same year and was the managing head of the Pennsylvania Steel Co., Steelton, Pa., from 1892 to 1906. About that time he rebuilt the steel making facilities of that company and became its vice-president, which office he held until 1916. He was president of the American Tube & Stamping Co., Bridgeport, Conn., from 1917 to 1919 and is a director and member of the executive committee of that company. For many years he has been active in bridge building enterprises in this country, his name being associated with some of the largest spans, and he is now a consulting engineer and professional adviser, 120 Broadway, New York, for several steel companies. His latest work in bridge building is the new Bear Mountain Bridge over the Hudson River, New York.

J. V. W. REYNDERS

Howe Memorial Lecture

A year ago the Institute established the Henry M. Howe Memorial lecture as a feature of each annual winter meeting. The first one was delivered last February by Dr. Albert Sauveur, for many years an intimate associate and friend of Dr. Howe.

This year the second lecture was delivered by Dr. John A. Mathews, vice-president Crucible Steel Co. of America, whose contributions to the metallurgy of steel

stand in the front rank of those of American metallurgists. He took as his subject "Austenite and Austenitic Steel." He gave the results of recent research work aimed to establish some theories which had been advanced by him in former contributions. In part it embodied the result of work to explain the fact that there is more austenite in steel quenched in oil than in steel quenched in other media and to explain the relation which these phenomena bear to the question of magnetism. An abstract will be published in a later issue.

A Record in Banquets

The largest banquet in the history of the institute was held in the ballroom of the Waldorf-Astoria, Wednesday evening, Feb. 18. The attendance was 727 and as pointed out by the toastmaster, W. L. Saunders, chairman board of directors Ingersoll-Rand Co., New York, this large attendance was symbolic of the prosperity of the institute and was in strong contrast to the first banquets, which took place in a small room on the upper floors of the same hotel in the early days of the organization. Besides the usual addresses by the retiring president, William Kelly, and the new president, J. V. W. Reynders, there were speeches by Hon. Charles McCrea, minister of mines for the Province of Ontario, Canada, and Major General Charles P. Summerall, commanding second corps area of the United States Army.

A feature of the evening was the presentation of the James Douglas medal for 1925 to William H. Bassett, technical superintendent and metallurgist, American Brass Co., Waterbury, Conn., in recognition of his work in non-ferrous metallurgy. The medal was presented by B. B. Thayer, New York, chairman of the James Douglas medal committee.

New Developments in Aluminum Alloys*

Two Strong Products Perfected Having Superior Fabricating Properties—Comparisons with Duralumin

BY ROBERT S. ARCHER AND ZAY JEFFRIES

IT is about fifteen years since the development in Germany, largely by Alfred Wilm, of the aluminum alloy called duralumin. Despite the evident usefulness of this material, however, its commercial development has been slow, due in part to the difficulties involved in its fabrication.

In view of the potentially great utility of strong aluminum alloys, it seemed desirable to find means of producing such alloys with better fabricating properties. This has resulted in the production of two new types of aluminum alloy of the "strong alloy" class, having distinctly improved fabricating qualities. These alloys, including duralumin, are fundamentally wrought alloys. Castings of the same compositions heat-treated in the same manner give inferior physical properties, particularly as to ductility. The material referred to has, in general, undergone a reduction in section of at least 80 per cent by mechanical working.

Properties of Aluminum-Copper Alloys

The binary aluminum-copper alloys, free from magnesium, are affected in a manner similar to duralumin by quenching from around 500 deg. C. (932 deg. Fahr.), but do not, to any important extent, exhibit the spontaneous hardening effect on standing at ordinary temperatures. The development of one of the new types of alloy about to be described was based on the discovery that the binary aluminum-copper alloys can be further hardened after the quenching treatment by reheating to temperatures of 100 to 200 deg. C. and that, by the proper selection of temperature and time and composition, unexpectedly high physical properties can be obtained.

Some of the early results were obtained on an alloy containing 3.95 per cent copper, 0.35 per cent iron, and 0.21 per cent silicon. After quenching in water from 540 deg. C. and aging for 10 days at room temperature, the tensile strength was, in round numbers, 39,000 lb. per sq. in. and the elongation in 2 in. was 30 per cent. The same material reheated for 48 hr. at about 150 deg. C. gave a tensile strength of approximately 48,000 lb. per sq. in. with an elongation of about 20 per cent. The reheating at 150 deg. C., or "artificial aging," as it has been called, has thus produced an increase in tensile strength of about 23 per cent.

It was also found that the binary aluminum-copper alloys are much more easily worked than the alloys of the duralumin type containing copper and magnesium. The fact that a tensile strength of about 50,000 lb. per sq. in., coupled with a high elongation, could be obtained in a simple aluminum-copper alloy was unsuspected, and at once suggested the possibility of developing an alloy of this type that would after suitable heat treatment give physical properties similar to those of duralumin, namely, a tensile strength of about 60,000 lb. per sq. in. with an elongation of about 20 per cent, combined with improved working qualities. This has been done, and the tensile properties of the resulting alloy, after complete heat treatment, compare rather closely with those of duralumin.

The alloy now in commercial production may contain, besides copper, additions of other elements such as manganese and silicon. It is distinguished from duralumin, chemically, by the absence of magnesium and, physically, by the fact that it does not harden spontaneously at room temperature after quenching.

While the addition of manganese, silicon, etc., are important improvements, the heat-treating effects depend primarily on the presence of copper, and can best be considered with reference to the binary aluminum-copper alloys.

[The authors at this point discuss the constitution and heat treatment of aluminum-copper alloys and the mechanism of hardening.]

Aluminum-Magnesium-Silicon Alloys

It was shown by Wilm that alloys made by the addition of magnesium to commercial aluminum could be hardened by quenching from around 500 deg. C. followed by aging at room temperature, although Wilm seems to have been unaware, even as late as 1919, of the role of silicon in these alloys. The work at the National Physical Laboratory has indicated very strongly that it was the compound Mg_2Si which is responsible for the age-hardening effect.

Aluminum forms, with the compound Mg_2Si, a binary system. The maximum solubility of this compound in solid aluminum, occurring at 590 deg. C., is 1.6 per cent, corresponding to a magnesium content of about 1.0 per cent and a silicon content of about 0.6 per cent. This solubility decreases with temperature, like that of $CuAl_2$. After experimenting with alloys of various compositions at the National Physical Laboratory, it was concluded that the age-hardening effect was proportional to the amount of the compound

*Abstract of a paper presented at the annual February meeting of the American Institute of Mining and Metallurgical Engineers in New York, Feb. 16 to 18. The authors are metallurgist and consulting metallurgist, Aluminum Co. of America, Cleveland.

Mg_2Si dissolved. The age hardening is presumably due to the formation of very small highly dispersed particles of Mg_2Si. By heating at a temperature just under the melting point of the eutectic, say 575 deg. C., most of the Mg_2Si is dissolved in the aluminum and the solid solution is retained by quenching. This solid solution is found to be decidedly stronger, harder, and less plastic than the aggregate from which it was formed. On aging there occurs a precipitation of Mg_2Si from this supersaturated solid solution, in the form of very fine particles; this precipitation causes a further increase in hardness and decrease in plasticity.

The strength attained in alloys of this type by quenching from a high temperature and aging at ordinary temperature is not very great—usually well under 40,000 lb. per sq. in. The Brinell hardness is only about 70, which is not enough for satisfactory machinability, nor in many cases for satisfactory resistance to deformation. The yield point is also comparatively low.

In the laboratories of the Aluminum Co. of America, it was found that the hardness, strength and elastic ratio of these alloys could be further increased to a marked extent by artificial aging, that is by heating for suitable periods of time at temperatures from about 100 to 175 deg. C. By this means it was possible to obtain a tensile strength as high as 54,000 lb. per sq. in., a Brinell hardness of 120, and a yield point of about 40,000 lb. per sq. in. These changes were, of course, accompanied by a decided decrease in plasticity.

This discovery greatly increased the potential usefulness of this type of alloy. It was also found that these alloys possess excellent working qualities, the capacity for cold working in particular being quite remarkable. This may be judged from the fact that, in the annealed condition, the tensile strength may be as low as 15,000 lb. per sq. in. and the Brinell hardness less than 30, values only slightly higher than those for commercially pure aluminum. A hardness increase from 28 to 120 by heat treatment alone is, we believe, of a magnitude unique among nonferrous alloys.

Two New Types of Alloy

There are thus available two new types of strong aluminum alloy, the characteristics of which may be briefly summarized as follows:

1. The aluminum-copper type: shows substantially no hardness increase on aging at ordinary temperatures after quenching from around 500 deg. C., but is susceptible to marked hardening by reheating at 100 deg. to 175 deg. C. (artificial aging).

2. The aluminum-magnesium-silicon type: hardens to some extent on aging at ordinary temperatures, but is hardened to a further, and practically very important extent, by artificial aging.

Both of these types possess decidedly better working qualities than duralumin. The combination of copper and magnesium in aluminum seems to lead to comparatively poor working qualities, as in alloys of the duralumin type.

The mechanism of the changes brought about by heat treatment and aging is essentially the same for all the strong aluminum alloys. The hardening effects on aging are caused by the precipitation of hard constituents in the form of very small particles; this may take place spontaneously at room temperature or may require slightly elevated temperatures. The precipitation is from supersaturated solid solutions, formed by rapidly cooling the alloys from temperatures at which the constituents are considerably more soluble than at the aging temperature. Age hardening, therefore, depends on the presence of hard constituents, the solubility of which increases with temperature. Obviously the amount of such constituents in the alloy must exceed their solubility at the aging temperature.

Annealing

These alloys can be softened by annealing at 300 to 350 deg. C. The removal of the hardness caused by cold working is due to recrystallization and grain growth in the aluminum-rich solid-solution matrix. Softening by this mechanism continues as the temperature is raised, and would be more effective at temperatures just under the melting point than at the intermediate temperatures given above. If annealing at such high temperatures is attempted, however, it must be followed by very slow cooling or hardening effects will be obtained. All of these alloys are to some extent "air hardening."

The hardness of the heat-treated alloys is due to the retention of solid solution and the precipitation of many very small hard particles. These hardening causes are removed on annealing by precipitation and the growth of the precipitated particles to relatively large size.

Softening takes place slowly at temperatures as low as 150 deg. C.; it is practically complete at 300 to 350 deg. C.

[Solution and precipitation heat treatment are discussed at this point, followed by a description of the physical and other characteristics of the commercial grades of these types.]

Mechanical Properties and Machineability

The development of the full mechanical properties of which the alloys are capable is dependent on thorough mechanical working. These alloys are available in the form of sheet, bar, rod and wire, tubing, and shapes both rolled and extruded. Sheet in thicknesses up to ⅛ in., wire and bar up to ⅜ in. diameter, tubing and extruded molding and shapes may be considered as worked sufficiently to insure the development of the maximum properties. This applies to present average commercial practice. When necessary, comparable degrees of mechanical working may be obtained in heavier sections by starting with larger ingots. This has been done in the case of some heavy forgings.

These alloys are ordinarily used only in the heat-treated condition. It may, nevertheless, be of interest to indicate the properties that may be expected as the result of hot working followed by more or less cold working. After such treatment the aluminum-copper alloy will, in general, have a tensile strength of 30,000 to 45,000 lb. per sq. in. with an elongation of 10 to 3 per cent in 2 in.; while the aluminum-magnesium-silicon alloy will have a tensile strength of about 17,000 to 30,000 lb. per sq. in. with an elongation of 15 to 5 per cent.

Extruded material receives a partial heat treatment from its method of manufacture and, consequently, has a fair tensile strength combined with a very good elongation, as compared with cold-worked material.

These alloys in the heat-treated temper are readily susceptible to all ordinary machining operations. A somewhat novel application has consisted in machining from the aluminum-magnesium-silicon alloy, in the heat-treated condition, certain parts that are then annealed for a service that would otherwise require pure aluminum, a material quite difficult to machine.

Combination of Types

It will be apparent that duralumin is a combination of the two types of alloy here described, inasmuch as it contains copper and magnesium, both intentionally added, together with some silicon, which was present in an aluminum ingot as an impurity. The amount of silicon present in an aluminum ingot is quite variable, however, hence the amount obtained in duralumin by accident may or may not be most suitable. In view of the beneficial effects of silicon, alloys have been prepared of the duralumin type but containing more than the usual amount of silicon. A typical example of this type of alloy contained 4.32 per cent copper, 0.78 per cent silicon, 0.50 per cent magnesium, and 0.49 per cent manganese. After forging, this alloy was heated to a temperature between 500 and 515 deg. C. and quenched in water. After aging for three days at room temperature, the tensile strength was 59,300 lb. per sq. in. and the elongation 25 per cent. Artificial aging for 70 hr. at 120 deg. C. raised the tensile strength to 66,900 lb. per sq. in. with an elongation of 20.5 per cent. After a precipitation heat treatment of 20 hr. at 150 deg. C., the tensile strength was 75,300 lb. per sq. in. and the elongation 13 per cent. Thus, by combining the new information regarding composition and heat treatment,

it has been possible to produce an alloy of the duralumin type having greater strength and hardness than hitherto produced by heat treatment.

The strength of all of these aluminum alloys can be increased by cold working after heat treatment, but this added strength is obtained at a great sacrifice of elongation.

Applications

The alloys here described are, in general, applicable where it is desired to obtain high tensile strength and ductility combined with the lightness, corrosion resistance, and other desirable qualities of aluminum. The alloy of the aluminum-copper type is suitable for the same applications as duralumin and has the advantage of distinctly better fabricating qualities. The alloy of the aluminum-magnesium-silicon type is strong enough and hard enough for many purposes for which duralumin might otherwise be used and is remarkable for ease of forming.

The alloy of the aluminum-copper type is being used in the form of forgings for highly stressed parts such as automobile connecting rods and aircraft propellers. The alloy of the aluminum-magnesium-silicon type is very suitable for a great variety of hardware in which considerable strength and hardness are desired but in which the strength of the aluminum-copper alloy is not necessary.

Where very severe cold-forming operations are to be performed, the alloy of the aluminum-magnesium-silicon type can be used where none of the other strong alloys will stand the operations.

NEW TRADE PUBLICATIONS

Cranes and Winches.—Ricker Mfg. Co., Rochester, N. Y. Fourteen loose-leaf sheets devoted to illustrations of cranes of various sizes and for various purposes in industrial use, and to winches and other hauling and handling devices, including triplex blocks, tiering and elevating machines, etc. The equipment is for both hand and motor operation and includes both traveling and swinging units.

Pneumatic CO_2 Meter.—Uehling Instrument Co., Paterson, N. J. Six-page bulletin describing the Apex CO_2 recording and indicating meter, with sectional and other illustrations. The device is intended for all processes of combustion and all fuels.

Contractors' Transit.—Warren-Knight Co., 136 North Twelfth Street, Philadelphia. Four-page folder devoted to illustrated description of transits and levels for use of contractors and others. The bulletin is labeled I-27 and is concerned primarily with two models, one being surveyors' transit No. 25 and the other contractors' transit No. 27.

Heaters.—The American Blower Co., Detroit. Bulletin No. 1218 on the Venturafin heating unit, employing a peculiar form of tubular construction. It tells of transmission efficiency secured by winding tubes with a helical brass "fin"; also of its large capacity and simple installation. Size 12 pages, 8 x 11 in., copiously illustrated.

Buffing.—The Bias Buff & Wheel Co., Inc., 8 West Fortieth Street, New York. Folder explaining the construction and operations of the new centerless bias buff. Size four pages 8 x 10 in.

Gas Cooler.—Griscom-Russell Co., 90 West Street, New York. Form 208, describing special features in the twin-cooler construction and low resistance flow of the G-R Vaneflo gas cooler.

Noiseless Check Valves.—Smolensky Valve Co., Cleveland. Bulletin 2 of 8 pages illustrates and describes check valves designed to eliminate water hammer on any pump. The feature is a quick closing of the valve before the working pressure reverses and, with exceptionally large valve disk, a smaller stroke and quicker closing than with smaller disks.

Graphic Meter Manufacture.—Esterline-Angus Co., Indianapolis. Bulletin 1124 of four pages illustrates the construction of a recording meter and describes the characteristics of design and manufacture., Demand for products which will stand up under hard usage has resulted in the development of instruments which will meet that requirement.

Combustion Control.—Smoot Engineering Corporation, 136 Liberty Street, New York. Bulletins 16 and 17, four pages each, show apparatus in central station use for controlling combustion and making it more uniform. The master controller looks after air volume, stoker speed and other elements affecting the rate of combustion of the fuel.

Building Columns.—Lally Column Co., 4001 Wentworth Avenue, Chicago. Advantages of Lally columns over rolled steel H-columns are discussed in a 16-page pamphlet. The points stressed are economy in weight and design and in the use of space. They are said also to be more fire resistant than the structural steel columns and more resistant to oxidation.

Electric Power Apparatus.—Electric Machinery Mfg. Co., Minneapolis. Bulletin 861 has 16 pages well illustrated and devoted to synchronous motors for pumping purposes. These are shown connected up with various types of pumps, including rotary, reciprocating, centrifugal, etc., and are shown both with horizontal and vertical axes. The motors are three-phase or two-phase, are designed for 60, 50 or 25 cycles and for 220, 440, 550 and 2200 volts. The horsepower ratings range between 20 and 2000, at close intervals.

Measuring Carbon Dioxide.—The Brown Instrument Co., Philadelphia. Catalog No. 32, entitled "Measuring CO_2 Electrically," is an attractive illustrated description of apparatus developed by the company.

Baldwin Locomotive Loss

In sharp contrast to 1923, the Baldwin Locomotive Works reports total sales in 1924 of $26,080,352 against $102,762,075 in 1923. Last year after deducting costs, there was a manufacturing loss of $356,819, while in 1923, $25.58 a share was earned on common stock. Other income last year of $3,256,254 enabled the company to report gross profits of $2,899,434 which, after deductions, left $1,320,026 for dividends, against $6,516,464 in 1923. To pay common dividends, $1,400,000 was drawn from surplus, profit and loss surplus at the end of 1924 amounting to $18,367,269, against $22,647,242 in 1923. Current assets at the end of the year stood at $41,308,747 against current liabilities of $3,465,096.

Net income of the National Enameling & Stamping Co. for 1924 was $873,982 after all charges. Operating profits after Federal taxes amounted to $1,862,646 against $2,356,554 in 1923.

The Savage Arms Corporation showed net income of $693,799 in 1924, or $8.33 a share on 77,480 common shares, compared with $404,044, or $4.79 a share in 1923. President W. L. Wright said, "The company has improved its financial position during the year, and with present indication of general prosperity, the outlook is favorable."

The Gulf States Steel Co. has declared a dividend of 11½ per cent and also a regular quarterly common dividend of $1.25. With reference to the dividends, it was stated that during the last seven years $3,400,000 has been spent on property, out of earnings and in addition the company has recently acquired about 85,000 acres of coal land, which likely will be paid for out of earnings.

Standard Sanitary Earnings

Earnings of the Standard Sanitary Mfg. Co., Pittsburgh, for 1924, make the following comparison with 1923:

	1924	1923
Net after charges	$9,154,742	$8,081,592
Pension fund	25,000	25,000
Provision for dividends	326,599	328,858
Balance for dividends	8,803,143	7,732,734
Dividends paid	5,404,674	4,302,755
Surplus	3,398,469	3,429,979

Lima Locomotive Surplus

With sales of $14,577,135 in 1924, the Lima Locomotive Works shows net income of $1,500,043 after charges, compared with sales in 1923 of $20,236,868 and net income of $2,402,605. After dividends there was a final surplus of $655,815. Surplus amounted to $4,671,691 against $4,015,676 at the close of 1923. Current assets totaled $8,607,747 and current liabilities $1,241,917.

CUTTING TOOL ACTION

British Investigators Report on Deformation and Flow of Metal Under Action of Tool

(*By Special Correspondence*)

LONDON, ENGLAND, Jan. 23.—Interesting observations, which are thought to afford new insight into the mechanism of cutting-tool action, are outlined in a report of an investigation of the action of a cutting tool upon metal, presented to the Institution of Mechanical Engineers in London, Jan. 22, by Dr. Walter Rosenhain and A. C. Sturney, National Physical Laboratory.

The report, the title of which is "Flow and Rupture of Metals During Cutting," was presented on behalf of the institution's cutting tools research committee and the study is regarded as essentially of a preliminary and tentative nature. The main object of the investigation has been to study the deformation and flow of metal under the action of a simple cutting tool, and, more particularly, to observe the manner of separation by which the chip is formed. The method of study, namely, the microscope examinations of cross-sections taken through chips in process of formation, has, however, led to a series of interesting observations.

The material used as stock for the cutting experiments were normalized mild steel and cast brass. The steel had the following chemical composition: Carbon 0.142 per cent, silicon 0.067 per cent, sulphur 0.061 per cent, phosphorus, 0.064 per cent, manganese 0.65 per cent. The composition of the cast brass was: Copper 61.38 per cent, zinc 38.50 per cent, iron 0.06 per cent. The metal was in the form of cylindrical bar initially 3 in. in diameter. Each bar was turned down so as to leave a number of fins each 2.8 in. in diameter and 0.1 in. wide, separated from one another by slots 0.2 in. wide and 0.3 in. deep. In order to avoid any initial plastic deformation of the fins, the outer surface was removed by grinding before the experimental cuts were taken. The experimental cutting operations were performed with ordinary carbon steel parting tools each having a cross sectional area of ½ in. by ¼ in. and a hardness of about 90 as given by the Shore scleroscope test. The tools were roughly ground to shape, then hardened, and then reground to the desired angles in a tool-grinding machine.

Three Types of Cutting Observed

By using a simple type of cut and varying only two factors, namely depth of cut and top rake angle, certain definite regularities of behavior have become manifest. These may be summarized by saying that, according to the conditions of cutting, the separated metal takes the form of three distinct types of cutting, or "chip." In the first of these types, which has been termed the "tear" type, rupture of the metal occurs by the formation, well in advance of the nose of the tool, of a tear or crack tending to run inwards, from the periphery of the stock. Since such a tear cannot, obviously, progress very far, a succession of fresh starts are made by the tool, and the surface of the work is left in the form of rough projections, each of which probably corresponds to successive shearing of the chip. In this type of cutting, which is the result of combining a relatively large depth of cut with a small top-rake angle, there is little or no real flow of the chip over the face of the tool or over any built-up front of the tool, although to a certain extent a part of the chip in contact with the tool face slides upward as shearing progresses. The motion is small, but the pressure large. When conditions are changed by either reducing the depth of cut or increasing the top-rake angle, or both, the ultimate result is the formation of the third type of chip, which has been called the "flow" type. Under intermediate conditions an intermediate type of chip is formed which has been termed the "shear" type, since it is mainly formed by a process of shearing on a plane making an angle of roughly 30 deg. with the direction of motion of the tool.

The change from one of these types to the next is gradual, but an attempt has been made to determine in a rough quantitative manner the relations of the two variable factors to the various characteristics of the cut in regard to the nature of the chip, the roughness of the surface produced, and the average depth of cut made as compared with intended depth. In the formation of the "flow" type of chip, the principal movement occurs, without actual fracture, in a direction at right angles to this plane of shear, and usually takes the form of a continuous spiral or ribbon; this is definitely associated with the smoothest cut surface and the closest agreement between intended and average depth of cut.

Results of Investigation Summarized

So far as the present investigation goes, the following results are claimed:

1.—That the average depth of cut is greater than the intended depth of cut, and that the excess of the former over the latter increases with depth of cut.

2.—That for a given top-rake angle the degree of irregularity increases proportionately with the depth of cut.

3.—That the average depth of cut is very much greater than that intended when small top-rake angles are used, but decreases rapidly as the top-rake angle increases until, with an angle of about 15 deg., it approximates closely to the intended depth of cut.

4.—That the degree of irregularity varies with the top rake in a manner very similar to the variation of the average depth of cut.

For depths of cut of 0.010 in. and 0.015 in. in mild steel, the transition from the "tear" type to the "flow" type of chip is complete at or about the same top-rake angle. It may, therefore, be inferred that these high degrees of irregularity and abnormal depths of cut are met with only when the tear and shear types of chip are produced, and that, so long as the flow type of chip is formed, whatever may be the values of depth of cut and top-rake angle, the surface will have a minimum irregularity, and that the average depth of cut will not differ sensibly from that intended.

In the tear type of chip, the whole of the chip moves outward relatively to the tool until rupture occurs; then the tool infringes upon fresh metal. This action is likely to result in considerable wear on the cutting edge. When the flow of type of chip is formed, however, the deformed zone, being stationary so far as motion relative to the tool is concerned, acts as a protection to the nose of the tool, and the actual cutting action proceeds from the apex of the deformed zone. So long as the chip continues to come off in a continuous ribbon, or breaks at a point some distance from its root, the only wear on the tool will occur at a point some distance from the nose. This wear will be greater with small top-rake angles. If the top-rake angle of the tool is made so large that the deformed zone disappears, the nose will be immediately subject to wear.

Austrian Magnesite Industry

Roasted magnesite for refractory purposes, produced in Austria, amounted to 170,000 tons in 1922 and 150,000 tons in 1923, according to the United States assistant trade commissioner in Vienna. Figures for 1924 are not yet available, but are known to be considerably below those of 1923. Exports in the first nine months of 1924 aggregated 53,000 tons, valued at $1,000,000, compared with 85,000 tons in all of 1923, valued at $1,650,000. In each case about one-half of the total went to the United States. Shipments to Great Britain declined from 13,000 tons in 1923 to less than 1000 tons in the first half of 1924.

American imports carried in American vessels in the 12 months of 1924 were 32.18 per cent of the total water-borne imports, compared with 31.40 per cent in 1923. Similarly, exports sent out in American bottoms were 38.21 per cent of the total, a reduction from the 38.48 per cent of 1923.

CHARGES DENIED

Knife Information Bureau Says It Is Not Restraining Competition

WASHINGTON, Feb. 24.—Denial that it is engaged in a conspiracy to fix uniform prices at which machine knives, paper mill bars, machine bed plates, cutting tools, etc., should be sold by its members, or that it is stifling competition or committing other violations of the law, is made in the answer filed by the Federal Trade Commission by the Knife Information Bureau. The answer was filed by James L. Bruff, attorney for the respondents, and George Butterfield, secretary of the Knife Information Bureau. Replying to charges made by the commission against so-called practices under the reporting plan of the Bureau, the answer states that this plan was abandoned on Oct. 9, 1923.

Answering charges made against the alleged base price list, the reply states that this list was compiled and had been used in the knife industry long before the association was organized and was not the result of concerted action by members of the Bureau. It is further stated that the list did not contain actual selling prices but was merely a base to which each member applied its own individual discounts without reference to discounts of other members. The discounts, it is stated, were not uniform, and the price list did not fix or maintain uniform prices nor have a tendency so to do. It is further added that the use of the base price did not enhance prices, but was in conformity with an old trade custom. The use and occasional revision of a base price list, it is contended, do not create monopoly nor restrain trade or competition and do not in any manner interfere with the free and normal flow of commerce.

HOW MILLIONS ARE LOST

Department of Commerce Issues Guide to Better Packing, After Nationwide Survey

Dr. Julius Klein, director of the Bureau of Foreign and Domestic Commerce, has issued the following statement:

"The millions of dollars lost annually through carelessness or unjudicious packing which invites pilferage and destroys goods through breakage or other damage, is a tax on industry which all those sharing in the distributive process should join forces to eliminate.

"Realizing the necessity of cutting down this marginal waste, the House Committee on Merchant Marine in 1921 requested the Transportation Division of the Department of Commerce to make a nationwide survey. After three years of intensive field investigation, study and technical research, conducted in cooperation with shippers, container manufacturers and the Forest Products Laboratory, the department has just published the results of its findings in 'Packing for Foreign Markets.'

"The best practices evolved from the rich experience of some of our oldest export houses as well as the exact results of thousands of scientific tests are covered in this publication. The fundamental principles which these studies have disclosed can be applied by any shipper, of any commodity, and with almost equally as much force to the domestic as to the foreign field.

"In addition to primary rules on container construction and packing which apply in an equal degree to almost all articles, the book presents a study of the problems peculiar to the products of many of our more important industries. Chapters, with specification charts, are devoted to commodity groups, such as machinery, agricultural implements, automotive products, iron and steel.

"As a compendium of the best information available, I am certain you will find that this publication contains a wealth of suggestions on methods and practices which are directly applicable to your business.

"Copies may be obtained by application to the Superintendent of Documents, Government Printing Office, Washington, or through any of the district or cooperative offices of the Bureau of Foreign and Domestic Commerce. The price is $1.25."

Report of the Patent Office

Operations of the United States Patent Office are detailed in the report of the Commissioner, which was transmitted to Congress under date of Jan. 31. Gains are recorded in nearly all of its activities. Patents issued, including designs and trade-marks, numbered 63,062 in 1924, compared with 57,512 in the preceding calendar year. Applications of all kinds were received to the number of 101,134. Omitting trade-marks, the number of patents issued, including re-issues and designs, was 45,500. This number has been exceeded only once, there having been 45,927 such issues in 1916. The total number of patents up to Dec. 31, 1924, from the beginning of the numbering series in 1836, is 1,521,589.

From the table showing the year-by-year returns, it appears that not until 1867 did the number of patents reach 10,000. In 1883 the 20,000-mark was first passed. In 1903 the figure passed 30,000 for the first time. The first year with more than 40,000 patents was 1914. Every year since then, except for 1918, 1919 and 1920, has shown more than 40,000 patents.

Financially, the receipts of the year were greater than ever before in the history of the patent office. They amounted to $3,152,793, of which $2,636,288 applied on applications for inventions, designs, trade-marks, etc. Most of the remainder was paid for copies of patents or photostats, manuscripts, assignments, etc. Expenditures during the year for salaries and all other purposes amounted to $3,561,395, leaving a net deficit of $408,602. Deducting this deficit from the surplus in the Treasury at the beginning of the year, the net surplus Dec. 31 was $7,932,739.

A comparison is made between the number of patents issued by the United States and the number issued by the other principal countries of the world. As many of the foreign reports for years later than 1922 were not available, the comparison is made up to the end of 1922. The totals for the principal countries on this basis are shown in the table below:

United States	1,450,318	Canada	224,236
France	663,782	Italy	170,043
Great Britain	611,512	Switzerland	99,123
Germany	386,599	Total foreign	3,289,942
Belgium	317,298	Total all countries	4,740,260
Austria-Hungary	277,570		

Freight Traffic Continues Heavy

During the week ended Feb. 7, revenue freight loaded in the United States totaled 928,244 cars, making an aggregate of 5,379,237 cars for the first six weeks of the year. This compares with 5,200,287 cars for the corresponding weeks of 1924 and with 5,088,731 cars in 1923. It is the largest total ever recorded in the first six weeks of any year. Four of the six weeks this year have shown more than 920,000 cars in each case, while only one week of the first six weeks of any preceding year has reached that figure.

It is proposed to build across the Firth of Forth at Queensferry, Scotland, a suspension bridge of greater span than any bridge now existing. The two spans of this proposed bridge would be 2400 ft. each, and the estimated cost is £4,000,000. The longest present bridge span is the 1800 ft. of the cantilever bridge at Quebec. The longest suspension spans are the 1600 ft. of the Williamsburg Bridge in New York and the 1632 ft. of the Bear Mountain Bridge over the Hudson. The second longest span of any description already crosses the Firth of Forth, in the shape of two cantilever spans of 1710 ft. each.

Plans of New Companies

C. J. Pugh & Co., Salem, Ore., has been organized with $10,000 capital stock and will manufacture canning equipment, particularly fruit graders. A building has been erected and machinery is practically in place, so that operations may be started shortly. C. J. Pugh is president and J. H. Race, vice-president.

The American Rail & Pipe Co., 2016 Kanawha Street, Charleston, W. Va., has been organized with $50,000 capital stock to act as rail and pipe representative. It expects to add additional lines later. Harry Silverstein is one of the principals.

The Mechanical Improvement Corporation, Ocala, Fla., has been organized with $15,000 capital stock and is developing a motor which will be manufactured on a royalty basis. C. C. Bryant is secretary.

F. B. DeLong, Chicago manager of the Walworth Mfg. Co., Boston, and W. S. Babson, president Peerless Pacific Co., Portland, Ore., have organized the Peerless Co., and will open a warehouse in Seattle to carry stocks of plumbers' and steamfitters' supplies, with Mr. DeLong in charge.

The Charles D. Schmidt Corporation, New York, has been incorporated with $100,000 capital stock to manufacture automobile brake lining and similar products. Plans for operations will be delayed until organization matters are cleared away. R. S. Kristeller, O. W. Swift and H. D. Watson are the incorporators. Temporary address, care of Mr. Swift, Watson, Kristeller & Swift, 68 William Street.

The Directional Safety Signal Co., 50 Broadway, New York, incorporated with $1,000,000 capital stock, will operate as distributor for the products of the General Safety Signal Co., 141 Commerce Street, Newark, N. J.

The Master Metal Products Co., Inc., 291 Chicago Street, Buffalo, has been organized to take over the business of the Geibel Metal Products Co., with the following officers: J. F. Geibel, president; M. M. Baker, vice-president; E. E. Spangle, secretary; E. J. Tate, treasurer and general manager. Its products, chief of which are sanitary cans, are sheet metal stamped. Other products will be turned out later. The company's largest purchases will be in galvanized and extra smooth steel sheets.

Hannibal Green's Son & Co., Inc., Troy, N. Y., recently incorporated, will continue an established business in the distribution of iron, cold rolled steel and heavy hardware. Griswold Green is president-treasurer, and M. H. Fitzpatrick, general manager.

The Federated Radio Corporation, 43 Exchange Place, New York, recently incorporated with 500,000 shares of stock, no par value. Of this 110,000 shares are being offered at $21. At the conclusion of this financing the company will have $400,000 in cash and will control by majority ownership several large manufacturers and dealers in radio equipment. Among the directors are A. H. Johnson, president Rova Radio Corporation, and Dixon C. Williams, president Chicago Nipple Mfg. Co. Thus constituted, the Federated corporation will be a self contained unit, governing manufacturing and assembling operations and merchandising. L. T. McFadden is president.

The Albany Steel Hot Water & Steam Boiler Co., Albany, N. Y., has been incorporated to operate as indicated and plans to erect or rent a plant, although no contracts are being let at this time. Some equipment has been acquired and the company has limited capacity for building steel boilers. It will be in the market for equipment from time to time. Address R. R. Whitney, 452 Broadway, Albany.

The Premier Equipment Corporation, Inc., Interurban Viaduct and Calhoun Avenue, Houston, Tex., has been incorporated to continue a business in the repair of cars and locomotives. It will also buy and sell cars, locomotives, rails, industrial equipment, machinery, etc. M. R. Ducey is president.

The recently incorporated Hydro-Electric Pump & Supply Co., 605 Curry Building, Ross and Fourth Streets, Pittsburgh, will maintain a complete stock of electric driven pumps and repair parts. It will also act as representative for the Columbus Gear & Pump Co., Columbus, Ohio, and the Dayton-Dowd Co., Quincy, Ill. F. W. Smith is manager.

The Bauer Machine Works, Inc., 3334 Virginia Street, Kansas City, Mo., has been incorporated as a reorganization of the company by that name manufacturing machinery and parts.

The Stromberg Motor Devices Corporation, 517 West Fifty-seventh Street, New York, has been organized as a subsidiary of the parent company by that name at Chicago. All manufacturing will be done by the parent company. J. E. Morehouse is manager.

The W. J. Loth Stove Co., Waynesboro, Va., incorporated with $400,000 capital stock, has acquired the business of a partnership established in the manufacture of stoves, ranges and heaters. F. Percy Loth is general manager.

The Holcombe Textile Equipment Co., Inc., 1501 Fifth Avenue, North, Birmingham, Ala., has been organized with $40,000 capital stock to take over the assets of the Holcombe Bunch Builder Co. The same lines will be manufactured and in addition several other textile machinery specialties. Plant and equipment are adequate for present needs. G. C. Illingworth is president-treasurer.

Thomas O'Neill, sole owner of the partnership of Ingram & O'Neill, 947 Second Avenue, Huntington, W. Va., has incorporated the business as the Thomas O'Neill Machine Shop, giving Clark Applegate, general manager, an interest in the business which is exclusively in the machine repair line.

C. L. Tolles, Inc., Eau Claire, Wis., is the incorporation of an established business manufacturing steam log hauling engines, snow plows, rutters, etc. All manufacturing is done by contract. Mr. Tolles plans to increase the business.

The Detroit Sanitary Mfg. Co., 731 Pallister Street, Detroit, has been organized with $200,000 capital stock to manufacture metal goods, plumbers' specialties, etc. Amos J. Springborn is one of the principals.

The Michigbean Growers Exchange, Globe Building, Detroit, has been organized to manufacture portable outfits for hulling beans, holding patents on bean cleaning, polishing and sorting equipment. It purposes to build and lease the equipment. It has plant and equipment for present needs, but expects to be required to enlarge later. R. V. Judson is one of the principals.

Industrial News Notes

The South Bend Chilled Plow Works, South Bend, Ind., for 50 years identified with plow manufacturing, has been merged with the Vulcan Plow Co., Evansville, Ind., and will be moved to that city. It is understood that J. O. Casaday, president of the South Bend company becomes one of the executives of the Vulcan company.

The Tennessee Coal, Iron & Railroad Co. has contracted with the Chapman-Stein Furnace Co., Mount Vernon, Ohio, for a recuperative continuous billet heating furnace, for Birmingham, Ala. This will be end charging, but side discharging and will heat 2½-in. square billets 11 ft. long. Its normal capacity will be 7½ tons per hr. Producer gas will be used for fuel.

The real estate holdings of the Recording Devices Co., Dayton, Ohio, have been sold for $70,000 by William G. Pickrel, Dayton, and W. C. Willard, Columbus. This company was placed in the hands of a receiver in July, 1923.

Installation of a new turbine, costing $300,000, has been begun by the Columbus, Delaware & Marion Electric Co., at its Scioto Power Station, near Delaware, Ohio.

The Cincinnati Terminal Warehouse Co., Cincinnati, will erect crude oil tanks to cost $3,500. W. T. Bock is the contractor.

Charles R. Long, Jr., Louisville, Ky., has acquired the interests of Harry Vissering, Chicago, in the four concerns manufacturing railway supplies of which they have been joint owners. The four companies are the Charles R. Long, Jr., Co., Louisville, Ky., manufacturer of railway paints; Harry Vissering & Co., Chicago, manufacturer of valves, metallic packing, bell ringers and car and locomotive equipment; the Okadee Co., Chicago, manufacturer of locomotive devices; and the Viloco Machine Co., Benton Harbor, Mich, manufacturer of locomotive and car devices.

The Seagrave Corporation, a new Michigan corporation, has purchased the Seagrave Co., Columbus, Ohio, manufacturer of fire fighting apparatus. The capitalization of the new concern will be $1,200,000 preferred stock and slightly more than 100,000 shares of no par value common stock. Julius F. Stone, president of the Seagrave Coporation since 1910, will be chairman of the new board of directors. H. B. Spain, vice-president and general manager of the old company, will be president of the Seagrave Corporation.

The Austin Co., Cleveland, has recently taken the following contracts for factory buildings: The C. U. Williams Co., Bloomington, Ill., building with 30,000 sq. ft. of floor space for the manufacture of burners; The Animal Trap Co. of America, factory building at Lititz, Pa., with 30,000 sq. ft. of floor space; The Bird-Archer Co., New York, branch plant at Chicago with 18,000 sq. ft. of floor space.

Machinery Markets and News of the Works

RAILROAD ACTIVITY BEGUN

Illinois Central and Delaware, Lackawanna & Western Issue Lists

General Electric Prominent Among Industrial Buyers—Market on the Whole Is Quiet

THE expectation that among the major railroad lists that of the Illinois Central would be first to appear has been borne out with the issuing of an inquiry by that railroad during the week for 19 machines. The complete list, when it is issued, will total more than 67 items, most of the equipment being for the Markham Yards, Chicago.

A list has been also put out by the Rock Island Lines, nine machine tools being wanted.

The Delaware, Lackwanna & Western is inquiring for 19 machines for shipment to its various shops.

The General Electric Co. has been prominent among industrial buyers, although action has not been taken as yet on the list of equipment for its radio department.

The Nash Motors Co., which closed for several machines during the week, is expected to take additional equipment.

On the whole, the market has been quiet, although in some districts there has been a slight increase in the volume of inquiry.

New York

NEW YORK, Feb. 24.

THERE is an increasing volume of inquiry for machine tools with prospects of an early arrival of the railroad purchasing that has been long expected. Thus far the outstanding railroad inquiry in this district is the list of the Delaware, Lackawanna & Western, reported last week as in the market. The equipment is wanted for the company's Scranton locomotive shops, East Buffalo car department, Kingsland shops, Hampton engine house, Kingston engine house, Keyser Valley shops and East Buffalo locomotive shops. The list follows:

5-ft. heavy duty radial drill.
Two sensitive drill presses, up to ¾ in.
50-ton Lucas power press.
5-in. Ajax forging machine.
10-ft. power brake or bending machine.
54 x 54-in. x 12-ft. standard metal planer.
2 x 24-in. turret lathe.
84-in. standard vertical boring mill.
54-in. horizontal boring mill.
36-in. Morton heavy-duty draw cut shaper.
16-in. x 6-ft. portable belt lathe.
Journal turning lathe with equipment for 3-cyl. locomotive work.
16-in. x 6-ft. heavy-duty bolt lathe.
6-ft. "Right Line" radial drill.
20-in. turret lathe.
32-in. shaper.
High-speed pipe cutting and threading machine.
Blacksmith hammer, Blacker, type B.

Recent railroad purchases have included a 36-in. x 12-ft. planer by the Boston & Albany, 48-in. carwheel borer by the Missouri Pacific, 44-in. side head boring mill by the New York Central & Hudson River Railroad and a 44-in. side head boring mill by the Toledo Terminal Railroad Co. Among industrial purchasers of tools the General Electric Co., Schenectady, N. Y., has been prominent the past week, closing on a half-dozen or more items for Schenectady and Bloomfield, N. J., including a lathe, shaper, milling machine, planer and drill. No action has yet been taken on the large list of equipment for the radio department of the General Electric Co. The major portion of the 26 tools for the Andes Copper Mining Co. is still pending.

Contract has been let by the Knickerbocker Ice Co., 41 East Forty-second Street, New York, to I. H. Meyer, 590 Sterling Place, Brooklyn, for a one-story automobile service and repair building, and one-story steam power house at Seventeenth and Hart Avenues, Brooklyn. C. Leslie Weir is company architect.

The Franklin Electrical Equipment Co., 235-37 Canal Street, New York, is making inquiries for electric motors, generators and dynamos.

The Department of Public Works, Borough of Queens, Queens, L. I., will begin the construction of a two-story incinerator plant, 43 x 106 ft., at the Barbadoes Basin, Rockaway Beach, L. I., to cost $280,000 including equipment. J. P. Powers, Far Rockaway, is architect.

Howard L. Smith, 19 West Forty-fourth Street, New York, architect, has plans for a three-story automobile service, repair and garage building, 107 x 197 ft., to cost $100,000 with equipment.

The Bell Telephone Laboratories, Inc., recently organized jointly by the American Telephone & Telegraph Co., and the Western Electric Co., 195 Broadway, New York, as a subsidiary, will take over the engineering department, laboratories, testing and manufacturing facilities of the two companies. Contract has been let to the Tidewater Co., 14 East Thirty-third Street, for a new eleven-story plant building at 463 West Street, to be occupied by the new organization, estimated to cost $600,000.

The American Can Co., 120 Broadway, New York, is said to be arranging an expansion program to cost approximately $5,000,000, including buildings and equipment. During the year past, the company expended close to $4,000,000 for similar work.

A company at Allende, Mexico, is arranging for the construction of an ice-manufacturing plant, for which concessions have been secured. It is purposed to have the works in service late in the summer. Ellis A. Bonnet, United States Consul, Piedras Negras, Mexico, has information regarding the project.

The American Gas & Electric Co., 30 Church Street, New York, operating electric light and power utilities in several cities, has arranged a bond issue of $9,000,000, a portion of the proceeds to be used for extensions and improvements. R. E. Breed is chairman of the board.

K. Dittmar, 57 Halsey Street, Brooklyn, architect, has plans for a one-story automobile service, repair and garage building on Hillside Avenue, Jamaica, L. I., 120 x 165 ft.

Samuel Brown, Ltd., 31 Johnston Street, Wellington, New Zealand, is interested in the purchase of copper, steel, brass, bronze materials, galvanized nuts and bolts and kindred equipment.

The Bureau of Foreign and Domestic Commerce, Washington, has information regarding a proposed hydroelectric generating plant to be constructed near the city of Soerabaya, Java, with initial capacity of 30,000 hp., to include transmission lines, automatic substations, etc., Reference 154,737.

The G. G. West Forty-first Street Garage, Inc., New York, recently organized, has leased the four-story building at 419-27 West Forty-first Street, 98 x 100 ft., for a service, repair and garage establishment, and will take possession at once. I. C. Schwalb and F. A. Marmor head the company.

In connection with a 1925 expansion program, the Air Reduction Co., 342 Madison Avenue, New York, plans the construction of a new acetylene plant at Kansas City, Mo., to cost $200,000 with equipment. The California Cyanide Co., Los Angeles, a subsidiary, is arranging a bond issue of $1,250,000, a portion of the proceeds to be used for extensions and additional machinery.

The Masterton Engineering & Machinery Co., Ltd., Perry Street, Masterton, New Zealand, is interested in the purchase of iron and steel products and agricultural machinery.

J. M. Felson, 250 West Fifty-seventh Street, New York, architect, has plans for a three-story automobile service, repair and garage building at 633-37 West 134th Street, 75 x 100 ft., to cost $80,000.

The Board of Education, City Hall, Freehold, N. J., plans the installation of manual training equipment in its three-story high school, estimated to cost $250,000. Alexander Merchant, 1 Elm Row, New Brunswick, N. J., is architect.

The Water and Light Committee, Chatham, N. J., has been authorized by the Borough Council, to arrange for the installation of a new electric-operated pumping unit, with capacity of 1,000,000 gal. every 24 hr., including a similar pump, with gasoline engine, for emergency service. Present steam-operated equipment will be discarded.

The Shamrock Mfg. Co., 314 Market Street, Newark, manufacturer of radio equipment and machines, has leased a portion of the building at 194-96 Waverly Avenue for the establishment of a new plant.

The Board of Education, Irvington, N. J., is considering a recommendation for the establishment of manual training departments in the present Clinton and Coit schools, with tools and equipment estimated to cost $14,000.

Edward C. Epple, Union Building, Newark, architect and engineer, will take bids for a new two-story plant, 31 x 64 ft., at Irvington, N. J., in March, to be occupied by the Forstner Chain Co., Irvington.

F. H. Crawford, 299 Broadway, New York, is in the market for a 42-in. Bullard New Era vertical lathe.

Buffalo

BUFFALO, Feb. 23.

TRADE is slowly improving in new and used machine tools. Some foreign business is coming in, hack saw makers in particular noting a demand.

The R. S. McMannus Steel Construction Co., Buffalo, will erect an addition 73 x 125 n., which will double its capacity.

The Plastergon Wall Board Co., Buffalo, will let contracts within a few days for the erection of a new $250,000 plant to replace one recently destroyed by fire. It will be in two units, 150 x 200 ft., one story.

Bids will be received by the Superintendent of Lighthouses, Buffalo, until March 9 for 17,000 ft., of armored submarine cable.

The Truscon Steel Co., Albert Street, Youngstown, Ohio, is said to have plans under advisement for the erection of a new distributing plant at Buffalo. N. H. Sturdy is company engineer.

The New York State Gas & Electric Corporation, Ithaca, N. Y., is concluding arrangements for the purchase of the electric light and power house and system of D. Thorne Gardner, Burlington, N. Y., and plans extensions, including transmission line and automatic substation equipment.

The Champion Paper Corporation, Carthage, N. Y., is being organized to take over and expand the local mill and business of the Champion Paper Co. It will also acquire the Carthage Power Corporation, operating a hydroelectric power plant, and will make extensions. To provide for the purchases and proposed expansion, a bond issue of $600,000 is being sold. R. B. Maltby is vice-president.

The Walling Carriage Works, 301 John Street, Utica, N. Y., is considering the erection of a new two-story building estimated to cost $23,000. J. Parks is general manager.

The American Radiator Co., Austin Street, Buffalo, is planning for the installation of a number of steel tanks with capacity of 12,000 to 15,000 gal. each. Stanley B. DeLong is vice-president and general manager.

The Rochester Gas & Electric Co., Rochester, N. Y., is said to have tentative plans for a steam-operated electric power house on Lawn Street, to cost $300,000 with machinery.

The Board of Education, City Hall, Syracuse, N. Y., will soon ask bids for remodeling a building on Fenton Street, formerly used as a factory, as an annex to the Delaware vocational school, estimated to cost $40,000. E. A. Howard, Everson Block, is architect.

The Dye Oil Co., 118 Eldridge Street, Binghamton, N. Y., has plans for a one-story storage and distributing plant at Oneonta, N. Y., estimated to cost $40,000 with equipment. It is expected to begin work in May.

A. M. Anderson, purchasing agent, North East Electric Co., Rochester, N. Y., plans to purchase an 8-ft. bending brake for $\frac{1}{16}$-in. stock.

Manual training and vocational departments will be installed in a new school building, two stories and basement, at Olean, N. Y., to cost $100,000, for which the Board of Education has awarded a general contract to Wright & Kremers, Niagara Falls, N. Y.

W. Edwin Carlson, 30 Anderson Street, Jamestown, N. Y., and associates, are planning the establishment of a local factory for the manufacture of a patented wooden container. Special machinery and equipment will be required.

The Rochester Gas & Electric Co., Rochester, N. Y., will award a steel contract to the Bethlehem Steel Co. for a steam industrial power plant, to cost about $500,000 with equipment.

Philadelphia

PHILADELPHIA, Feb. 23.

THE Philadelphia Spring Works, Inc., Philadelphia, has sold its property on Hutchinson Street, 45 x 176 ft., improved with a two and one-half story building, to L. Rodenhausen, who is said to be planning to occupy for a kindred line of manufacture.

Bids are being asked by the United States War Department, Lieut. F. E. Lewis, Oregon and Twenty-first Streets, Philadelphia, in charge, until March 9, for the construction of an auxiliary boiler plant at the local Government station.

Fire, Feb. 16, destroyed a portion of the plant of the Conkling-Armstrong Terra Cotta Co., at Tioga, Philadelphia, with loss estimated at $150,000 including equipment. Headquarters of the company are in the Denckla Building.

The Philadelphia Suburban Gas & Electric Co., West Washington Square, Philadelphia, has arranged for a bond issue of $2,100,000, a portion of the proceeds to be used for extensions in power stations and system. An expansion program includes the reconstruction of coke ovens at Chester, and the installation of additional equipment. Morris W. Stroud is president.

The American Oil Co., American Building, Baltimore, is contemplating the construction of a new oil storage and distributing plant in the vicinity of Philadelphia, estimated to cost $35,000. Lewis Blaustein is president. T. J. O'Connell is company engineer.

C. M. Roswell, 1015 Chestnut Street, Philadelphia, machinery dealer, has inquiries out for a frequency changer electric set, about 2500 kw., 60 cycle, 300 r.p.m.

The Foreign Trade Bureau, Philadelphia Commercial Museum, has received the following inquiries: (43237) from F. L. Brooks & Co., Ltd., 121 Bunhill Row, London, E.C.1, England, interested in getting in contact with American manufacturers of bolts, nuts, rivets, builders' hardware, trunk hardware, ice cream freezers, machinists' tools, carpenters' and cabinet-makers' tools, and saws; (43232) from Solar & Hermano, Isabel la Catolica 44, Santo Domingo, Dominican Republic, interested in the purchase of American mills for salt grinding, electric-operated; (43246) from Hafiz Mohamed Ashfaq Sayid, Sadar Bazar, Delhi, India, desirous of getting in touch with American manufacturers of cutlery and hardware products; (43233) from F. Cantu y Hno, Calle Guanajuato 28, Monterey, Mexico, in the market for a chicle tablet manufacturing machine to handle production from grating of material to wrapping, automatically; (43238) from Miguel Cuenca y Escrig, Avenida Reina, Victoria 17, Madrid, Spain, desirous of getting in touch with American manufacturers of commercial hardware, galvanized iron plates, corrugated sheets, steel and brass goods.

J. Harry Menkins, 2310 Fairmount Street, Philadelphia, magnetos and kindred electrical automotive equipment, has leased the building at 1435 Vine Street, for a new plant.

The Crane Market

THE overhead crane market continues active with a fairly large volume of inquiry including a number of prospective purchases that may be made at any time. One of the heaviest inquiries of overhead equipment is the Phoenix Utility Co., 71 Broadway, New York, which, in addition to 50-ton stationary hoists and a number of gate hoists, is understood to be receiving quotations on two 100-ton overhead cranes with specifications on a third in preparation, a 5-ton gantry and a 5-ton hand power crane. The General Electric Co., Schenectady, N. Y., is accepting bids on a 3-ton, 47-ft. 6-in. span single leg gantry crane for Terre Haute, Ind. The A. P. Smith Mfg. Co., East Orange, N. J., in the market for two 2-ton and two 5-ton overhead electric cranes, is understood to have closed on the 2-ton cranes with the Shepard Electric Crane & Hoist Co. The Miami Copper Co., New York, recently in the market for a 25-ton, 4-motor overhead crane is reported to have closed. The locomotive crane market is showing considerable activity. A number of purchases are reported this week and a large volume of inquiry is in the market. The Whitehead & Kales Co., River Rouge, Mich., is in the market for a used locomotive crane of 60-tons capacity or larger.

In the New England district, the Edison Electric Illuminating Co., Boston, is in the market for a fairly large overhead crane. The Yale & Towne Mfg. Co., which has been quoting 65 and 10 per cent off list on differential hoists is reported to have dropped quotation of the additional 10 per cent.

Among recent purchases are:

Sanderson & Porter, engineers, 52 William Street, New York, a 30-ton locomotive crane from the Browning Co.

New England Coal & Coke Co., for the Mystic Iron Works, Boston, two 20-ton locomotive cranes from the Industrial Works.

A. P. Smith Mfg. Co., East Orange, N. J., two 2-ton electric overhead cranes from the Shepard Electric Crane & Hoist Co.

Jerome Pagano, 2642 Park Avenue, New York, stone yard, a 15-ton, 45-ft. span, 3-motor overhead crane from an Eastern builder, with 200-ft runway from a large structural company.

Price Bros. & Co., Ltd., Montreal, have purchased for a new mill at Lake St. John, two 5-ton, two 6-ton, three 15-ton, two ½-ton, one 12-ton and one 20-ton hand power crane; one 15-ton, 87-ft. span, 5-motor overhead crane; two 16-ton hand power transfer bridges; four 4-ton, four 1½-ton, one 3-ton, one 2-ton, one ½-ton, two 5-ton and one 10-ton hand power trolleys, all from the Dominion Bridge Co.

Milton Point Lumber Co., Milton Point, N. Y., a 20-ton used Ohio locomotive crane from Philip T. King, New York.

Strong Steel Foundry Co., Buffalo, N. Y., an electric crawl-tread locomotives crane from an unnamed builder.

City of Providence, R. I., a 25-ton locomotive crane from the Brown Hoisting Machinery Co.

Tompkins Brothers, Newark, N. J., an electric locomotive crane from an unnamed seller.

Kohler Co., Kohler, Wis., a 5-ton electric traveling crane from Manning, Maxwell & Moore, Inc., Shaw Electric Crane works.

The new airplane manufacturing plant to be erected at Hammonton, N. J., will be owned and occupied by the Anderson Aeroplane Corporation, Atlantic City, N. J., recently organized by William S. Anderson of that place, and associates. A site of 22 acres has been acquired near the White Horse Pike and Plymouth Road. The initial works will be 200 x 300 ft., with several smaller buildings, and will make a specialty of small aeroplanes with aluminum wings, etc. D. W. B. Haining, Guarantee Trust Building, Atlantic City, is architect.

The Pennsylvania Railroad Co., Broad Street Station, Philadelphia, is said to be planning the construction of a new engine house with repair facilities, at Altoona, Pa. A. C. Shand is chief engineer.

The Borough Council, Perkasie, Pa., has tentative plans for extensions in the municipal electric light and power plant, with the installation of additional machinery.

The Board of Education, Taylor, Pa., is considering the installation of manual training equipment in its proposed two-story and basement high school, estimated to cost $250,000, for which it will at once ask bids on a general contract. John J. Howley, Traders' Bank Building, Scranton, Pa., is architect.

The City Council, Lock Haven, Pa., is said to be planning the installation of pumping machinery and accessory equipment in connection with extensions in the municipal waterworks.

The Lehigh Coal & Navigation Co., Coaldale, Pa., has work under way on a new automatic power substation at Hauto, Pa., in conjunction with the Pennsylvania Power & Light Co., Allentown, Pa., for operations at its properties in the vicinity of Tamaqua, Pa.

The Martin Parry Corporation, York, Pa., manufacturer of commercial automobile bodies, with branch plants at Indianapolis and other points, has disposed of a stock issue of about $750,000, a portion of the proceeds to be used for expansion.

A. J. O'Neill, 1524 Chestnut Street, Philadelphia, will purchase a saddle tank locomotive and switches, not over ten years old.

The Motor Fuel Corporation, Franklin, Pa., recently organized by C. B. McFarlin, Eau Claire, Pa., and associates, with a capital of $100,000, will establish a plant for refining heavy hydrocarbon oils into gasoline and naphtha. Equipment requirements will include agitators, pumps and transmission and conveying machinery.

The Allentown Glass & Mirror Works, Inc., Allentown, Pa., will install electrically operated grinding, polishing, mitering and beveling machinery, and is interested in prices.

New England

BOSTON, Feb. 23.

A SLIGHT improvement is noted in machine tool sales, but activity, if it can be called such, centers in used tools. One house disposed of four fairly large pieces of equipment to nearby industries, but details are withheld. Inquiries are increasing, particularly for used equipment, and are coming from the Pacific Coast and France.

Massachusetts radio plants are working overtime, but machinery manufacturers collectively are comparatively inactive. Operating schedules at some of the largest electrical plants are decreasing rather than increasing. In Vermont there is a surplus of labor in machine shops. New England railroad repair shops generally are on a five-day per week schedule. In Connecticut metal working plants in some sections are working overtime, but are not interested in machine tools to any appreciable extent.

Prices on new tools are firm. One Connecticut maker has advanced quotations on individual machines about 10 per cent, and the Ames line of bench lathes and millers is about that much higher. Small tools are fairly active, but the February showing will probably not be as good as January, as in two or three instances business has dropped rather abruptly the past week or ten days.

Conveying and other equipment will be required for a grain elevator and box manufacturing plant contemplated by the George L. Cady & Sons Co., Western Avenue, Lowell, Mass. Plans are private.

The Wilcox Novelty Co., Main Street, Athol, Mass., has awarded contract for a two-story, 40 x 66 ft. addition. Plans are private.

Plans are in progress for a $350,000 elementary school to contain manual training shops, contemplated by the city of Lawrence, Mass. Walter Rochefort is mayor. Ashton-Huntress & Alter, 477 Essex Street, Lawrence, are the architects.

The Simplex Wire & Cable Co., 201 Devonshire Street, Boston, has awarded a contract for a three-story and basement, 80 x 100 ft. unit on Pacific Street, Cambridge. Stone & Webster, Inc., 147 Milk Street, Boston, are the engineers.

The Segal Metal Products Co., Springdale, Conn., has plans for additional buildings and remodeling present structures to provide additional equipment space. The company will remove several departments temporarily to New York to allow for the expansion without interruption.

B. S. Brown, 65 Franklin Street, Boston, engineer, has plans for a two-story automobile service, repair and garage building, 120 x 180 ft., at Allston, Boston, to cost $150,000 with equipment.

The Narragansett Electric Lighting Co., Providence, R. I., is arranging for an increase in capital from $20,000,000 to $30,000,000, a portion of the proceeds to be used in connection with an expansion program, recently started.

In addition to extensions now in progress, the American Tube & Stamping Co., 471 Hancock Avenue, Bridgeport, Conn., plans the erection of five additional structures, four of which will be used for the electrical department. The other building will be for hot strip steel rolling.

The Stewart-Warner Speedometer Corporation, 1826 Diversey Boulevard, Chicago, has taken over the former plant of the M. B. Schenck Co., Meriden, Conn., manufacturer of casters, and will establish a branch works.

Buck & Sheldon, Inc., 60 Prospect Street, Hartford, Conn., architect, has plans for a four-story automobile service, repair and garage building, 150 x 235 ft., to cost approximately $375,000 with equipment.

Fire, Feb. 13, destroyed a portion of the plant of the Electrical Appliance Mfg. Co., Waterbury, Conn., with loss estimated at $40,000 including equipment.

Chicago

CHICAGO, Feb. 23.

THE Illinois Central has issued inquiries for 19 machines in addition to the three mentioned in last week's report and it is understood that the complete list, when issued, will embrace 67 items, most of them for the locomotive department of the Markham Yards, Chicago. The Rock Island Lines have put out inquiries for nine machine tools. The Nash Motors Co. has closed for four centering machines, two turret lathes, a power-hammer, and 15 spindles of heavy-duty geared drills. It is also expected to close for considerable additional equipment, particularly for the Ajax plant at Kenosha. Ninety-day options on machinery for the latter plant will expire early in March. Fairbanks, Morse & Co. contemplate rearranging the pump department at their Beloit, Wis., works, and are counted on to buy some new equipment. Final action on the Chicago Board of Education's inquiry for 24 engine lathes for the Tilden Technical High School is expected by March 4. So far as actual buying is concerned, the machine tool market continues to drag.

Illinois Central List

All machines to be equipped for motor drive, except where otherwise specified.
One 96-in. 600-ton capacity driving wheel press.
Eight grinding machines with 18 x 3-in. wheels.
One tube cutter to cut 2 to 6-in. flues.
One 7-ft. x ⅝-in. bending roll.
One 10-ft. pneumatic boiler shop flanging clamp.
One 4-in. bar shear.
One heavy-duty boiler-shop double end punch and shear with 60-in. throat, to shear and punch ⅞-in. plates.
One 2¼ x 24-in. turret lathe.
One 3 x 36-in. turret lathe.
One No. 5 knee-type milling machine.
One 18-in. turret brass lathe.
One 36-in. vertical turret lathe.

Rock Island Lines

Two 100-in. locomotive pin turning and wheel quartering machines to turn crank pins up 28⅝ in. in length and 10 in. in diameter.
One 40-in. x 48-in. x 14-ft. heavy duty planer with two heads on cross rail.
One 18-in. upright light duty drill press.
One 15-in. light duty lathe.
One plate bending roll to roll boiler sheets up to 16 ft. in length and 1¼ in. thick.
Two belt-driven locomotive driving box and rod bushing presses, 60 tons capacity.
One McCabe, or equal, flanging press to handle ¾-in. plate.

The Illinois Central Railroad has awarded a contract to Joseph E. Nelson & Sons, Chicago, for the construction of foundations for locomotive and car repair shops at Paducah, Ky. The structures include a locomotive erecting shop, a locomotive repair shop, a carpenter shop, a car repair shop, a wood mill and store-room, a boiler shop, a blacksmith shop, a foundry, a power house, an air-brake shop and a tank shop, to cost $6,000,000.

The Pacific Fruit Express has awarded a contract to Guthrie & Co., Portland, Ore., in connection with the building of its car repair shops at Nampa, Idaho, to cost $450,000.

The Wonder State Mfg. Co., 1800 East Seventeenth Street, Little Rock, Ark., has completed a plant including 20,000 sq. ft. of floor space and an office building, 20 x 50 ft. Erection of a machine shop will be started soon and a warehouse is to be built during the summer. The company will manufacture commercial bodies, porch furniture, step ladders and toy parts.

H. W. Caldwell & Son Co., a subsidiary of the Link-Belt Co., Chicago, is constructing a five-story warehouse and office building on the west side of Western Avenue, between Seventeenth and Eighteenth Streets, to cost $150,000.

The Chicago Tool & Engraving Machinery Co., 542 Washington Boulevard, Chicago, has plans for a one-story factory, 75 x 110 ft., to cost $35,000. A. W. Fisher, 9129 Commercial Avenue, is architect.

The Albertson Co., Floyd Avenue, Sioux City, Iowa, manufacturer of implements, etc., has awarded a general contract to Coomer & Small, United Bank Building, for a two-story machine shop, 150 x 165 ft., to cost $50,000 including equipment.

The Cairo Cotton Oil Mill Co., Cairo, Ill., has plans for a one-story cottonseed oil mill, to cost $150,000 including machinery. E. M. Murray, 86-88 North Third Street, Memphis, Tenn., is architect and engineer. G. M. Greenwood is president.

The Great Northern Railway Co., St. Paul, Minn., will ask bids early in March for the construction of a new 18-stall engine house, with repair facilities, at Troy, Mont. A. H. Hogeland is chief engineer.

The Board of Education, Des Moines, Iowa, is planning the installation of manual training equipment in the proposed new junior high school, estimated to cost $400,000, for which preliminary plans are being prepared by Proudfoot, Rawson & Souers, Hubbell Building, architects.

Swift & Co., Union Stock Yards, Chicago, meat packers, are said to be arranging a call for bids in March, for an eight-story refrigerating and cooler plant at Sioux City, Iowa, 100 x 100 ft., to cost in excess of $500,000 with machinery. C. H. Kane is company engineer.

The Standard Oil Co., Mason City, Iowa, has preliminary plans for a new storage and distributing plant at Ninth Street and Carolina Avenue, including a machine shop. The entire works will cost approximately $150,000 with equipment.

The Tri-State Telephone & Telegraph Co., 369 Cedar Street, St. Paul, Minn., has plans for a three-story service and distributing works, including an automobile service, repair and garage department for company motor trucks and cars, to cost $160,000, including equipment. Mather & Fleishbein, Endicott Building, are architects.

The Board of Education, Lincoln, Neb., is considering the installation of manual training equipment in the proposed three-story Irving junior high school, estimated to cost $600,000. Meginnis & Schaumberg, Bankers' Life Building, are architects.

The Continental Scale Works, Inc., 2126 West Twenty-first Place, Chicago, is finishing plans for a one-story factory, 145 x 150 ft., to cost about $70,000. E. G. McClellan, 7441 Cottage Grove Avenue, is architect.

The Donahue Steel Products Co., Inc., 203 North Jefferson Street, Chicago, is in the market for 2,- 3- and 4-in. upsetting and forging machines, also Rockwell or American rotary furnaces, National bent tappers, a No. 60 Waterbury Farrell thread roller and a 4000-lb. board drop hammer.

St. Louis

ST. LOUIS, Feb. 22.

WORK will begin on a one-story addition to the plant of the Hutchinson Foundry & Machine Works Co., Hutchinson, Kan. J. P. O'Sullivan is general manager.

Harry A. Rubin, 1335 Grand Avenue, Kansas City, Mo., and associates, plan the erection of a three-story automobile service, repair and garage building to cost $100,000 with equipment.

The Pine Bluff Compress & Warehouse Co., Pine Bluff, Ark., plans the installation of compressing machinery and accessory equipment and power apparatus, in connection with proposed extensions to cost approximately $100,000. J. P. Daly is general manager.

The Missouri Power & Light Co., Boonville, Mo., is said to be arranging a construction and improvement program to cost approximately $1,500,000, including extensions in power plant and substations, with additional equipment and transmission lines.

The Board of Fire and Water Commissioners, Kansas City, Mo., A. J. Stewart, purchasing agent, is taking bids

for equipment for waterworks extensions and betterments as follows: Until March 18, for two 24-million gal. per day capacity centrifugal pumps without motors, eight 35-million gal. per day units without motors, three 2500-gal. per min. centrifugal pumps with motors, two 500-gal. per min. units with motors, and two 250 gal. per min. centrifugal pumps with motors, contract 7; two 2000 hp. and eight 400 hp. synchronous motors, and five 30-kw. motor-generator sets, contract 8; three switchboards, instruments, etc., contract 9; one outdoor substation, with apparatus, contract 10. Fuller & Maitland, 600 Walnut Street, are engineers.

The International Harvester Co., Fourteenth Street, Kansas City, Mo., has acquired a building at Fourteenth and Liberty Streets for its motor truck division and will remodel for a machine shop and service works. W. L. Simms is branch manager. Headquarters are at 608 South Michigan Avenue, Chicago.

The City Council, Independence, Mo., is having estimates of cost made for extensions in the municipal electric light and power plant, including additional equipment. Black & Veatch, Mutual Building, Kansas City, Mo., are engineers.

The Board of Education, Library Building, Kansas City, Kan., contemplates the installation of manual training equipment in its proposed high school in the Rosedale district, estimated to cost $200,000. Rose & Peterson, Brotherhood Building, are architects.

The American Crossarm & Conduit Co., 332 South Michigan Avenue, Chicago, manufacturer of crossarms and other equipment, will build a new branch factory, 100 x 112 ft., on Campbell Street, Kansas City, Mo. A. general contract has been let to the Bickel Co., A. and R. Building, Kansas City.

The Underwriters Land Co., Pitcher, Okla., plans the construction of a one-story lead and zinc ore mill to cost $175,000 with equipment.

The Board of Public Service, City Hall, St. Louis, is asking bids until March 10, for refrigerating machinery to be installed in the Union Market, estimated to cost $70,000. L. R. Bowen and H. Updike, City Hall, are engineers.

Detroit

DETROIT, Feb. 23.

BIDS will be asked on a general contract in about 60 days by the Saniwax Paper Co., 4148 North Park Street, Kalamazoo, Mich., for a one-story and basement addition, 370 x 500 ft., to cost $150,000 with equipment. LeRoy & Newlander, Pratt Building, are architects and engineers.

The Luce Furniture Co., Grand Rapids, Mich., will rebuild the portion of its plant recently destroyed by fire with loss approximating $350,000, including equipment.

The Hayes-Ionia Co., Ionia, Mich., is arranging to remodel a portion of its plant for the manufacture of wood automobile bodies, instead of devoting solely to metal body production. Wood-working machinery will be installed, including equipment formerly used at the company plant at Grand Rapids, Mich.

The H. & H. Wheel Service, Inc., 3932 Cass Avenue, Detroit, manufacturer of automobile wheels, has tentative plans for the construction of a one-story addition.

The City Council, Kalamazoo, Mich., has called a special election on April 7, to approve a proposition for extensions in the municipal electric light and power plant and the installation of additional machinery.

The Lake Superior District Power Co., Ironwood, Mich., is arranging an expansion and improvement program to cost about $1,000,000. It will include the installation of a new generating unit and accessory equipment at the steam-operated generating station at Ashland, Wis., as well as expansion and additional machinery at the Big Falls hydro-electric plant near Ladysmith, Wis.

The Board of Education, Centerville, Mich., is considering the installation of manual training equipment in its proposed high school to cost $100,000, for which preliminary plans are being drawn by Edward S. Batterson, Hanselman Building, Kalamazoo, Mich.

The F. Joseph Lamb Co., 1938 Franklin Street, Detroit, is in the market for a large power punch press, a vertical slotter with at least 15-in. stroke and a vertical boring mill, about 48-in. swing.

The Forged Seamless Tube Co., South Lyon, Mich., is inquiring for a used tumbling barrel to handle tubes 20 ft. long.

Albert Kahn, Marquette Building, Detroit, architect and engineer, is completing plans for a three story, reinforced concrete assembly building, 80 x 640 ft., for the Hudson Motor Car Co., Detroit.

Indiana

INDIANAPOLIS, Feb. 23.

THE National Engineering & Equipment Co., Farmers' Trust Building, Anderson, Ind., has inquiries out for a complete gravel washing plant, including hoists, screens, conveyors, etc., with capacity of about 500 cu. yd. per day.

The Indianapolis Reed Co., 2217 Massachusetts Avenue, Indianapolis, has awarded a general contract to Brown & Mick, 226 East Michigan Street, for a new two-story plant, 30 x 38 ft., to cost approximately $22,000.

The Indiana & Michigan Electric Co., South Bend, Ind., recently organized to take over and consolidate the local company of the same name and the Twin Branch Power Co., is disposing of a bond issue of $8,000,000, a portion of the proceeds to be used for extensions and improvements. It will complete a steam-operated electric generating plant of the Twin Branch company, designed for an initial output of 80,000 kw.

The expansion to be carried out at the plant of the Tokheim Oil Tank & Pump Co., Wabash Avenue, Fort Wayne, Ind., will consist of two one-story buildings, 85 x 200 ft., and 40 x 60 ft. The first noted will be used as a tank shop addition and contract has been let to the Olds Brothers Construction Co., First National Bank Building; the other unit will be a galvanizing shop, and award for erection will soon be let. The structures will cost about $75,000. Guy Mahurin, Standard Building, is architect. C. O. Griffin is secretary and treasurer.

The Common Council, Noblesville, Ind., has preliminary plans for the construction of a municipal electric light and power house.

The Straube Piano Co., Hammond, Ind., has plans for a new four-story factory, 85 x 160 ft., and will soon begin work. J. T. Hutton & Son, Hammond Building, are architects.

The Industrial Electric Co., Indianapolis, will remove its plant immediately from 609 to 742 East Washington Street, where larger facilities will be provided for increase in output.

The Berryhill Malleable Iron Co., a new organization, Evansville, Ind., has secured a 9-acre site for a malleable iron foundry to be built immediately.

Gulf States

BIRMINGHAM, Feb. 23.

PLANS are under way by the Baton Rouge Electric Co., Florida Street, Baton Rouge, La., for extensions in its steam-operated electric generating plant, including the installation of a 3500 kw. turbo-generator and accessory equipment. Stone & Webster, Inc., 147 Milk Street, Boston, is engineer.

The City Council, St. Augustine, Fla., is taking bids until March 23 for waterworks extensions, including pumping station, deep-well pumping units and accessories, steel tanks and water towers, 300,000 gal. and 60,000 gal. capacity, respectively. Joseph E. Craig, 427 King Street, Jacksonville, Fla., is consulting engineer.

Favrat & Livaudais, Hibernia Bank Building, New Orleans, architects, have completed plans for a five-story automobile service, repair and garage building, to cost $150,000.

The Southern Power & Light Co., Jackson, Miss., recently organized to take over and consolidate other plants, has arranged a preferred stock issue of about $1,440,000, a portion of the proceeds to be used for extensions in power stations and transmission lines. H. C. Couch is vice-president.

The Clarke Garage Co., Inc., New Orleans, has leased a six-story building to be erected at Gravier and Dryades Streets, to cost in excess of $300,000.

The City Council, Fort Payne, Ala., is arranging for the immediate installation of additional equipment at the municipal electric light and power plant.

E. P. Maddox, 305 South Adams Street, Fort Worth, Texas, and associates, contemplate the construction of a one-story ice-manufacturing plant in the Arlington Heights, estimated to cost $65,000 including equipment.

The Common Council, Brady, Texas, will install pumping equipment and accessories, and steel tank and tower in connection with extensions in the municipal waterworks, estimated to cost $100,000, for which bonds have been voted.

The Dollins Coal & Lumber Co., Greenville, Texas, is considering the establishment of a wood-turning plant for

the manufacture of baseball bats, tool handles, etc., and purposes to make machinery purchases at an early date.

The City Council, Hazlehurst, Miss., has preliminary plans under advisement for the installation of a municipal electric light and power plant.

The American Power & Light Co., 71 Broadway, New York, is arranging a fund of about $9,000,000, a portion of the proceeds to be used for extensions and improvements in Florida property. The Miami Beach Railway Co., Miami, Fla., plans the construction of a machine shop, to cost close to $100,000; the Miami Light & Power Co., Miami, plans extensions in its power house, estimated to cost $3,000,000 with machinery, of which approximately $1,000,000 will be used for additional equipment; the Florida Power & Light Co., Miami, operating the Miami Gas Co., plans extensions to cost close to $1,000,000 with equipment.

The City Council, Corpus Christi, Texas, will make extensions in the municipal waterworks, and install a Diesel engine, high and low-service electric-operated pumping units, and accessory equipment, estimated to cost $90,000. N. Werenskoid, Marvin Building, Dallas, Texas, is engineer.

The Board of Education, El Paso, Texas, has approved plans for a vocational school to cost about $130,000 with equipment. It will include a machine and automobile repair and parts shop; carpenter and wood-working shop, etc. Trost & Trost, Two Republics Building, are architects.

The Peoples' Ice & Manufacturing Co., Sebring, Fla., is arranging for expansion at its plant, and the installation of additional equipment to triple the present output. T. W. Lawton is president and general manager.

The Georgia Marble Co., Tate, Ga., is in the market for a locomotive crane and an air compressor.

The Humphreys-Boyd Oil Co., Mexia, Tex., is completing plans for the construction of a new storage and distributing plant, to cost $150,000 with equipment.

South Atlantic States

BALTIMORE, Feb. 23.

PRELIMINARY plans are under consideration by the Town Council, Smyrna, Del., for extensions in the municipal electric light and power plant, estimated to cost $40,000. Bonds will be issued.

Bids have been asked on a general contract by the Standard Gas Equipment Co., Baltimore, for a one-story plant, 100 x 136 ft., to cost $65,000. Parker, Thomas & Rice, Union Trust Building, are architects.

The office of the chief of engineers, United States Army, Washington, will take bids until March 17, for one gasoline engine centrifugal pumping set, circular 19.

The Virginia-Carolina Equipment Co., Inc., Lynchburg, Va., has inquiries out for a stone crushing plant, with elevator, screens, drill, compressor and auxiliary equipment, capacity about 200 cu. yd. per day.

The Virginia Portland Cement Co., National Bank of Commerce Building, Norfolk, Va., will build a one-story machine shop, 50 x 150 ft., in connection with other extensions.

Gorman L. Burnett, P. O. Box 291, Lynchburg, Va., has inquiries out for a 150 hp. boiler, with accessory equipment.

The Board of Education, Denton, Md., plans the installation of manual training equipment in its proposed two-story and basement high school, estimated to cost $150,000, for which bids will soon be asked on general contract. Theodore W. Pietsch, American Building, Baltimore, is architect.

The American Locomotive Co., 30 Church Street, New York, is planning the erection of a new tank shop at Richmond, Va., about 160 x 400 ft., to cost $150,000 with equipment.

The Richmond Cedar Works, Inc., Richmond, Va., manufacturer of ice cream freezers, tubs, washing machines, etc., has arranged for a bond issue of $2,250,000, a portion of the proceeds to be used for expansion. The company also operates plants at other points. W. J. Parrish is president.

R. P. Johnson, Wytheville, Va., machinery dealer, has inquiries out for a hardwood floor machine, capacity about 60 lin. ft. per min.

The Grove Stone & Sand Co., P. O. Box 480, Asheville, N. C., is considering the purchase of a heavy duty clam shell bucket, suitable for dredging river rock and sand, about 1¼-yd. capacity.

Masson's Express, 3 West Pratt Street, Baltimore, will install an automobile service, repair and garage in connection with a three-story warehouse, 100 x 120 ft., estimated to cost $100,000, for which bids will be asked on a general contract. John Freund, 1037 St. Paul Street, is architect.

The Southern Railway System, Washington, is said to be planning to proceed with the erection of a new engine house with repair facilities, and boiler house at Atlanta, Ga., to cost $110,000 with equipment.

The general purchasing officer, Panama Canal, Washington, will take bids until March 13 for cable, wire, fans, steel cabinets and stands, duplex pumps, journal jacks, vises, reamers, taps, shovels, wire cloth, shackels, steel hopper lips, rails, pig iron, etc., Panama circular 1657.

The Lockhart Power Co., Lockhart, S. C., has disposed of a bond issue of $1,500,000, a portion of the proceeds to be used for extensions in power plant and system.

The Consolidated Gas, Electric Light & Power Co., Lexington Building, Baltimore, is said to be considering the erection of a new power house at 622 Forest Street.

The Utility Commission, Elizabeth City, N. C., is taking bids until March 18, for six vertical, slow speed pumping units, with motors, starters, shafting, etc., in connection with a proposed sewage pumping station. William C. Olsen, Raleigh, N. C., is engineer. W. Ben Goodwin is chairman.

The Common Council, Roseboro, N. C., is said to be planning the installation of pumping machinery in connection with a proposed waterworks, estimated to cost $60,000. The J. B. McCreary Co., Charlotte, N. C., is engineer.

The Wilson-Hock Co., City Point, Va., machinery dealer, has inquiries out for electric motors, 10 to 25 hp., 3-phase, 60-cycle, 550 volts; also for one 80 hp. horizontal boiler, 125 lb. working pressure; one electric-operated hoist, 7 tons capacity, with 40 ft. boom, three-phase, 60-cycle, 550-volt motor, and for one air compressor, belt or motor-driven, capacity about 50 cu. ft. per min.

The Federal Motor Truck Co., Federal and Campbell Avenues, Detroit, is said to be completing plans for a factory branch and service building at 242 Peachtree Street, Atlanta, Ga., estimated to cost $40,000.

The Broad River Power Co., Columbia, S. C., has arranged for the purchase of the plant and system of the Lexington Electric Light & Power Co., Lexington, S. C., and will take over the property May 1. Extensions are planned, including additional equipment. The company has construction under way on a steam-operated electric power plant on the Broad River, near Parr Shoals, S. C.

The La Grange Iron Works, La Grange, Ga., has purchased the J. T. Tice Co. of that city, and is operating the business on a normal basis. The LaGrange works manufactures brass and aluminum castings, specializing in grey iron castings of all kinds, ranging from 1 oz. to 1 ton. It also deals in various iron and steel products. It is interested in purchasing a few additional machine tools.

Pacific Coast

SAN FRANCISCO, Feb. 18.

CONTRACT has been awarded by the American Meter Co., 1123 Harrison Street, San Francisco, for its three-story plant at Bryant and Eleventh Streets, 115 x 120 ft., estimated to cost $165,000 with machinery.

The San Diego Consolidated Gas & Electric Co., San Diego, is disposing of a preferred stock issue to total $600,000, a portion of the proceeds to be used for extensions in power plants and system.

Motors and other electric power equipment, conveying machinery, etc., will be installed in the proposed six-story publishing plant to be erected by the Bellingham Publishing Co., Bellingham, Wash., 80 x 125 ft., to cost $650,000, with machinery.

The State Highway Commission, Forum Building, Sacramento, Cal., has preliminary plans for a one-story repair and maintenance shop, 60 x 120 ft., for State motor trucks and cars at Fresno, Cal., to cost $50,000, with equipment.

The Southern California Edison Co., Los Angeles, is arranging an appropriation of about $400,000 for extensions in the vicinity of Pomona, Cal.

The Indioleum Products Co., Spokane, Wash., recently organized with a capital of $195,000, to manufacture rubber products, has preliminary plans under way for a factory, estimated to cost $75,000, of which approximately $40,000 will be used for the purchase of machinery. The company is headed by George B. Reed and Samuel Reichert. It is represented by Davis, Heil & Davis, Zeigler Building.

The Albertson Motor Car Co., 1540 South Figueroa Street, Los Angeles, will build a two-story plant, 200 x 300 ft., for assembly and other work, estimated to cost $200,000 with machinery. A site has been secured at Long Avenue and

Fiftieth Street. J. M. Cooper, Marsh-Strong Building, is architect.

The Quality Enameling & Porcelaining Co., 1634-40 Howard Street, San Francisco, has begun the erection of a one-story plant, 100 x 150 ft. L. P. Nutcher is president.

The Weyerhouser Timber Co., Tacoma, Wash., has formed a subsidiary, the Clearwater Timber Co., to build a mill in the vicinity of Lewiston, Idaho. It will consist of several units, with power house and machine shops, estimated to cost $1,500,000 with machinery. The parent company has recently increased its capital to $6,000,000.

W. P. Hawley, head of the Hawley Pulp & Paper Co., Oregon City, Ore., Charles R. McCormick, president McCormick Lumber Co., St. Helens, Ore., and associates, are completing plans for a new paper mill in the vicinity of St. Helens, for the manufacture of kraft papers, estimated to cost $1,750,000 with machinery.

The Manufacturing Building Corporation, 268 First Street, San Francisco, manufacturer of building products, has awarded a general contract to Buschke & Brown, 604 Mission Street, for a four-story factory to be equipped as a metal spinning works, and metal production, to cost $70,000 with machinery.

The Pacific Gas & Electric Co., 445 Sutter Street, San Francisco, is planning for extensions in its plant and system in the vicinity of Fresno, to cost about $80,000.

The Coen Lumber Co., Roseburg, Ore., is planning the erection of a new planing mill and box-manufacturing plant to cost about $65,000 with equipment. A. S. Coen is president.

Cleveland

CLEVELAND, Feb. 23.

THE improvement in machinery sales in this territory noted last week has not kept up, according to reports of dealers who have booked very little business the past few days. However, sales by some of the machine tool manufacturers show a gain. A manufacturer of turret lathes booked a fair volume of business in single machines during the week and its February sales are already about equal to those of January. This company reports a large number of new inquiries from New England and the Chicago district, mostly for single machines. There is no activity in Detroit and machinery business that is being placed is coming almost wholly outside of the automotive industry.

The Seiss Mfg. Co., Phillips Avenue and the New York Central Railroad, Toledo, Ohio, has taken bids for a two-story factory addition, 40 x 60 ft. The company manufactures automobile accessories. J. G. Seiss is president and manager.

The Modern Pattern Co., Canton Avenue, Toledo, Ohio, has taken bids for a one-story addition, 30 x 60 ft., to be used as a lathe shop and wood turning department.

The B. F. Goodrich Co., Akron, Ohio, is preparing preliminary plans for a six-story and basement building, 200 x 450 ft.

The Lunn Sheet Metal Works, 3661 Munroe Avenue, Toledo, has awarded a contract for a one and two-story factory, 40 x 140 ft.

The Bryant Heater & Mfg. Co., Cleveland, will take bids for a one-story factory building, 150 x 300 ft. and a two-story office building. Edward P. Bailey, Jr., is president.

The Ralston Steel Car Co., Columbus, Ohio, is having plans prepared for additions to its plant providing 25,000 sq. ft. of floor space. Brauns & Watson, 1083 South High Street, Columbus, are the engineers.

The Tiny-Teeter Mfg. Co., Dayton, Ohio, manufacturer of baby carriages, has awarded a contract for a one-story plant addition, 38 x 75 ft.

The Ohio Public Service Co., 1800 Keith Building, Cleveland, subsidiary of the Henry L. Doherty Co., New York, is preparing preliminary plans for a $2,000,000 steam electric power plant to be located at Dilles, Belmont County, Ohio. This company is also working on plans for a substation to be built in Ashland, Ohio, and also for a substation to be built at Lorain, Ohio. George E. Snider, 1800 Keith Building, is the company engineer.

The Electric Controller & Mfg. Co., 2698 East Seventy-ninth Street, Cleveland, has placed a contract for alterations and additions to its plant involving an estimated expenditure of $40,000. The Geo. S. Rider Co., 612 Century Building, is the engineer.

Ground will be broken about May 1 for a two-story and basement school, to cost $150,000, for the Shawnee Township Board of Education, Lima, Ohio. Manual training and vocational departments will be installed.

Fire, Feb. 15, destroyed the plant and equipment of the American Clay Forming Co., Tiffin, Ohio, with a loss of $40,000. Plans for rebuilding are under way. Transmission, conveying and hoisting equipment will be required.

C. H. Hulme, 1924 East 105th Street, Cleveland, is inquiring for 12 No. 1 Kempsmith plain millers, three No. OOG and three No. OG Brown & Sharpe automatics.

Milwaukee

MILWAUKEE, Feb. 23.

EVIDENCE of a genuine revival in foundry and machine shop business is being reflected in an improving demand for equipment. A local tool building interest which has been idle for a long time is resuming operations on a moderate scale, with good orders for current delivery and prospects that augur well for continued production. On the whole, foundries and machine shops are averaging 70 to 75 per cent of capacity in operations.

The LeRoi Co., Milwaukee, manufacturer of gasoline engines, tractor and truck motive power units, self-contained generating plants, etc., has let the general contract to A. E. Roeske, 857 Sixty-eighth Avenue, West Allis, for a one-story brick and steel machine shop addition, 120 x 166 ft., to its main works at Sixtieth Avenue and Mitchell Streets, in West Allis. Equipment purchases will be made shortly. C. W. Pendock is president, and J. Roy Frantz, chief engineer.

The Mullins Body & Tank Co., Thirty-seventh Avenue and Lapham Street, Milwaukee, has taken additional floor space and is in the market for some new equipment. The company fabricates tanks, steel dump bodies for motor trucks, mechanical hoists and other similar products. C. J. Mullins is president and general manager.

The Roberts Brass Co., 178 Lincoln Avenue, Milwaukee, will build a two-story brick and mill foundry and machine shop addition, 70 x 110 ft., and has let the general contract to the Hercules Construction Co., 211 Grand Avenue, local. The extension will have a part basement for a heating plant.

The Common Council, Cedarburg, Wis., which is completing a new waterworks plant and system, contemplates the construction of a light and power plant at an estimated cost of $75,000. It is expected that a Diesel type of generating unit will be specified. John Armbruster is mayor, and Emil Schneider superintendent of the water and light department.

Stroebel & Bloedorn, 1436 Green Bay Avenue, Milwaukee, is building a one-story addition, 40 x 130 ft., to their sheet metal shop. Equipment purchases are being made.

The Harnischfeger Corporation, Milwaukee, formerly the Pawling & Harnischfeger Corporation, which took over the former Hercules Steel Casting Co. plant at 871-891 Robinson Avenue, Milwaukee, during the year, is making improvements and building a number of small additions. The work is in charge of O. T. Willms, plant layout engineer.

Builders Needs, Inc., 1243 Thirtieth Street, Milwaukee, manufacturer of metal building material and supplies, has engaged George Zagel & Brothers, architects, 144 Oneida Street, to prepare plans for a two-story addition, 60 x 120 ft. E. C. Weissinger is president and general manager.

The Wisconsin Tool & Mfg. Co., Milwaukee, has been organized with $50,000 capital stock by Henry G. Peterson, Anton Schaefer and James E. McCarthy, attorney, 128 Grand Avenue, to manufacture machinery, tools, shop equipment, etc. Plans for production are now being made. Considerable machinery will be purchased.

The Stoughton, Wis., Wagon Co., manufacturer of motor trucks, coaches, dump bodies, mechanical hoists, etc., is marketing a new issue of $75,000 of preferred stock to finance the construction and equipment of additions to its plant, largely for increasing the output of special trucks for highway and building contractors for hauling loose materials.

Pittsburgh

PITTSBURGH, Feb. 23.

MACHINE tool business in this district still is very quiet so far as actual sales are concerned. There seems to be a very fair amount of inquiry but prospective buyers continue to take plenty of time about placing the orders. The Westinghouse Electric & Mfg. Co. has inquired for a few additional tools and the Carnegie Steel Co. also has asked for prices on some tools that have not appeared in former lists.

Revised plans are being prepared by the Auto Truck Equipment Co., Inc., 7511 Penn Avenue, Pittsburgh, for a

two-story and basement addition for which bids received recently were rejected. Walter H. Stulen, 101 Market Street, is architect.

The Pittsburgh Transformer Co., Columbus and Preble Avenues, Pittsburgh, manufacturer of electrical equipment, will build an addition to cost $30,000.

The Water Commission, Ambridge, Pa., will take bids until March 5 for one triplex pump with capacity of 1,334,000 gal. every 24 hr., and for one vertical multiple cylinder, four cycle, natural gas engine, at least 116 bhp. D. M. Cooper is president.

The Auto Comfort Accessories Co., Oak Hill, W. Va., is desirous of getting in touch with a company equipped to contract for the manufacture of a quantity of radiator protectors. A. A. Vines is general manager.

The Campbell Creek Co., Dakota, near Rivesville, W. Va., has plans for the construction of a steel tipple with capacity of about 600 tons per hr., including shaker screens, etc.

The United States Engineer, Huntington, W. Va., will take bids until March 4 for one oil engine; one single stage, straight line air compressor, and one 3 kw. belt-driven electric generator set, circular 94.

The Henderson Structural Units Co., McKees Rocks, Pa., has awarded a general contract to J. H. Fetterman, Park Building, Pittsburgh, for a one-story plant to cost about $42,000 with equipment.

The Harpers Ferry Electric Light & Power Co., Harpers Ferry, W. Va., will rebuild the portion of its electric generating plant recently destroyed by fire. William H. Savery is president.

The Board of Commissioners, Morgantown Independent School District, Morgantown, W. Va., will call for bids on a general contract for the construction of a new high school, consisting of four units, of which one will be a manual arts and training school, to cost $600,000. Edward B. Lee, Chamber of Commerce Building, Pittsburgh, is architect.

Canada

TORONTO, Feb. 23.

PROGRESS continues to be made along the line of better conditions in the machine tool market. While large lists are not a feature, a fairly good demand has recently sprung up for tools in units of two or three, which cover practically every line of industry. During the past few days sales of equipment for water works, sewage and municipal electric plants have been fairly heavy. The Canadian National Railways have made some small purchases for car shop replacements, orders have been booked for pulp and paper mill equipment, and the automotive industry is also showing more interest in tools. The Dominion Alloy Steel Corporation, which is erecting a plant at Sarnia, Ont., has purchased considerable equipment the past few months, and it is understood that other purchases will be made within the next few weeks.

McLarty Brothers, and E. Charters of Sault Ste. Marie, Ont., have been awarded contract for the $150,000 section of the proposed $500,000 pulp mill on the Kagawong River, Manitoulin Island, for the Fox River Pulp & Paper Co., Fox River, Wis. The proposed mill will be equipped with three wood grinders. Work on the docks will be started immediately and it is expected that the plant will be ready for machinery by September.

The Pneu Oil Burner Co., 292 Sherbourne Street, Toronto, has secured a site at Jarvis and Richmond Streets, and will raze the present building and erect a new manufacturing plant.

Copies of tender forms and specifications have been received by the Department of Trade and Commerce, Ottawa, Ont., from D. H. Ross, trade commissioner, for material required by the Victorian Government Railway, Melbourne, Australia, for one 15-ton electric traveling Goliath crane. Closing date April 1, 1925.

Meade, Johnson & Co., Belleville, Ont., are installing equipment in new plant for manufacture of powdered milk, etc., and propose to build an addition next summer.

Beatty Brothers, St. George Street, Fergus, Ont., manufacturers of electric washing machines, lawn hydrants, etc., are receiving tenders in connection with alterations and additions to their plant.

The Leaside Brick & Sand Co., care of A. Berg, 117 Wellington Street West, Toronto, will establish a plant at Leaside, Ont., in about one month and will remove equipment from Hepworth, Ont.

Plans for an addition to foundry of the New Brass Ware Co. of Canada, Ltd., Montreal, will be re-drawn by the contractors, the Marotta Construction Co.

The Johnson Super Fuel Oil Burners of Canada, 150 King Street West, Toronto, are asking for prices on oil storage tanks from 100 to 5000 gal.; also on 25 cycle, single phase motors, 110 to 200 volts, from ⅛ to 1 hp.

The chairman of the Hydro-Electric Commission, Ottawa, Ont., is in the market for one 2000 kva. three-phase, oil insulated, self cooled transformer, and two induction regulators. J. E. Brown is general manager.

Firstbrook Brothers, 283 King Street West, Toronto, Ont., will purchase equipment for box making including saws, planers, box machines, nail machines, electric motors, etc.

Avery's Garage & Repair Shop, Kincardine, Ont., will rebuild the plant recently destroyed by fire. It will cost $40,000 and will require new equipment.

Finestone Autoparts Co., 973 St. Denis Street, Montreal, is in the market for drills, lathes, etc., for an automobile repair plant. J. Finestone is purchasing agent.

Jarry Freres, 2828 St. Lawrence Street, Montreal, is in the market for equipment for a garage and repair shop.

Western Canada

Bids for the three 2500 kva., transformers, delivered to No. 6 sub-station, Winnipeg, Man., are being received by the Chairman of the Public Utilities Commission, specifications, etc., at office of Winnipeg Hydro Electric System.

The Calgary Power Co., Calgary, Alta, will start work soon to increase the capacity of the substations at Calgary and Seebe, Alta. The company also plans the purchase of new transformers at an approximate cost of $75,000, to be installed at Seebe, Alta.

Cincinnati

CINCINNATI, Feb. 23.

THE Great Western Sewer Pipe Co., Junction City, Ohio, now being organized with a capital of $200,000, has plans under way for works to manufacture clay sewer pipe, drain tile, etc., estimated to cost $150,000 with machinery. The company is headed by J. D. Elder, William Baird and Calvin Henry, all of Junction City.

The William Koehl Co., 1034 Hulbert Avenue, Cincinnati, manufacturer of paper boxes and containers, has awarded a general contract to the Ferro Concrete Construction Co., Third and Elm Streets, for a one-story addition to cost $35,000. William Koehl is president and treasurer.

The Louisville Hydro-Electric Co., a subsidiary of the Louisville Gas & Electric Co., Louisville, has acquired 35 acres at Shippingport, a suburb of Louisville, as a site for a hydroelectric generating plant to cost more than $600,000.

The Fowler-Lewis Oil Refining Co., St. Elmo, Tenn., recently organized with headquarters at Chattanooga, Tenn., has plans for a one-story oil reclaiming and distributing plant, 60 x 100 ft., to cost $35,000 with equipment. Edward Fowler, 5415 Beulah Street, Chattanooga, is one of the heads of the company.

The Chesapeake & Ohio Railroad Co., Richmond, Va., is said to be planning extensions in its car and locomotive repair shops at Russell, Ky., with the erection of a new engine house and yard buildings to cost more than $1,000,000 with equipment.

The Norton Broadway Machinery Co., Cincinnati, has leased the two-story building of the Champion Tank & Mfg. Co., at 859-61 Hathaway Street, for new works. It will be remodeled.

The Tennessee Furniture Co., First Street, Chattanooga, Tenn., has awarded a general contract to T. S. Moudy & Co., Chamberlain Building, for a four-story and basement plant, 80 x 250 ft., to cost $100,000 with machinery. C. T. Jones, James Building, is architect.

The Nashville, Chattanooga & St. Louis Railroad Co., Nashville, Tenn., has awarded a general contract to the Gould Construction Co., Independent Life Building, Nashville, for rebuilding its engine house and shop at Hollow Rock Junction, Tenn., recently destroyed by fire, estimated to cost $55,000.

The Dings Magnetic Separator Co., Milwaukee, builder of magnets, magnetic pulleys and separators, announces the appointment of C. R. Considine as representative in Iowa and Minnesota territory, with offices at 1022 Langworthy Street, Dubuque, Iowa.

The E. L. Essley Machinery Co., Chicago, has completed negotiations with the Nazel Engineering & Machine Works, Philadelphia, for the exclusive sale of Nazel air hammers in the Chicago territory.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of items the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE, under the general heading of "Iron and Steel Markets" and "Non-Ferrous Metals."

Bars, Shapes and Plates

	Per Lb.
Bars:	
Refined iron bars, base price	3.24c.
Swedish charcoal iron bars, base	7.00c. to 7.25c.
Soft steel bars, base price	3.24c.
Hoops, base price	4.49c.
Bands, base price	3.99c.
Beams and channels, angles and tees, 3 in. x ¼ in. and larger, base	3.34c.
Channels, angles and tees under 3 in. x ¼ in., base	3.24c.
Steel plates, ¼ in. and heavier	3.34c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	3.20c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	3.55c.
Toe-calk, ½ x ⅝ in. and larger	4.20c.
Cold-rolled strip, soft and quarter hard	7.00c.
Open-hearth spring steel	4.50c. to 7.00c.
Shafting and Screw Stock:	
Rounds	4.15c.
Square, flats and hex	4.65c.
Standard tool steel, base price	15.00c.
Extra tool steel	18.00c.
Special tool steel	23.00c.
High-speed steel, 18 per cent tungsten	70c.

Sheets

Blue Annealed

	Per Lb.
No. 10	3.89c.
No. 12	3.94c.
No. 14	3.99c.
No. 16	4.09c.

Box Annealed—Black

	Soft Steel C. R. One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.45c. to 4.60c.	.....
Nos. 22 and 24	4.60c. to 4.75c.	5.25c.
No. 26	4.65c. to 4.80c.	5.30c.
No. 28*	4.75c. to 4.90c.	5.40c.
No. 30	4.85c. to 5.10c.	.....

Galvanized

	Per Lb.
No. 14	4.85c. to 5.00c.
No. 16	5.00c. to 5.15c.
Nos. 18 and 20	5.15c. to 5.30c.
Nos. 22 and 24	5.30c. to 5.45c.
No. 26	5.45c. to 5.60c.
No. 28*	5.75c. to 5.90c.
No. 30	6.25c. to 6.40c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
⅛ in. Butt...	46	29	⅛ in. Butt...	4	+19
¼ in. Butt...	51	37	¼ in. Butt...	11	+ 9
1-3 in. Butt..	53	39	1-1½ in. Butt.	14	+ 6
2½-6 in. Lap.	48	35	2 in. Lap.....	5	+14
7 & 8 in. Lap.	44	17	3-6 in. Lap...	11	+ 6
11&12 in. Lap.	37	12	7-12 in. Lap..	3	+16

Bolts and Screws

Machine bolts, cut thread, 40 and 10 per cent off list
Carriage bolts, cut thread, 30 and 10 per cent off list
Coach screws, 40 and 10 per cent off list
Wood screws, flat head iron, 72½, 25, 10 and 5 per cent off list

Steel Wire

BASE PRICE* ON No. 9 GAGE AND COARSER	Per Lb.
Bright, basic	4.25c. to 4.50c.
Annealed soft	4.50c. to 4.75c.
Galvanized annealed	5.15c. to 5.40c.
Coppered basic	5.15c. to 5.40c.
Tinned soft Bessemer	6.15c. to 6.40c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	19⅝c. to 20⅝c.
High brass wire	20⅛c. to 21⅛c.
Brass rods	17⅝c. to 18⅝c.
Brass tube, brazed	27⅝c. to 28⅝c.
Brass tube, seamless	24¼c. to 25¼c.
Copper tube, seamless	25¼c. to 26¼c.

Copper Sheets

Sheet copper, hot rolled, 23c. to 24c. per lb. base.
Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin	Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20
IC	$11.25	$8.85
IX	12.85	10.85
IXX	14.40	12.55
IXXX	15.75	13.85
IXXXX	17.00	15.05

Coke—14 x 20	Prime	Seconds
80 lb.	$6.15	$5.90
90 lb.	6.30	6.05
100 lb.	6.45	6.20
IC	6.65	6.40
IX	7.85	7.60
IXX	9.00	8.75
IXXX	10.35	10.10
IXXXX	11.35	11.10

Terne Plates

8 lb. coating, 14 x 20

100 lb.	$7.00 to $8.00
IC	7.25 to 8.25
IX	8.25 to 8.75
Fire door stock	9.00 to 10.00

Tin

Straits, pig	61c.
Bar	68c. to 70c.

Copper

Lake ingot	16¾c.
Electrolytic	16½c.
Casting	16 c.

Spelter and Sheet Zinc

Western spelter	9¼c.
Sheet zinc, No. 9 base, casks	12c. open 12½c.

Lead and Solder*

American pig lead	10½c. to 11c.
Bar lead	14c.
Solder, ½ and ½ guaranteed	42c.
No. 1 solder	39½c.
Refined solder	33c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	75c. to 90c.
Commercial grade, per lb	35c. to 50c.
Grade D, per lb	25c. to 35c.

Antimony

Asiatic	24c. to 25c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb	36c.

Old Metals

The market is firm and more active. Dealers' buying prices are as follows:

	Cents Per Lb.
Copper, heavy crucible	12.50
Copper, heavy wire	12.25
Copper, light bottoms	10.25
Brass, heavy	7.75
Brass, light	6.25
Heavy machine composition	9.25
No. 1 yellow brass turnings	8.75
No. 1 red brass or composition turnings	9.00
Lead, heavy	7.75
Lead, tea	6.25
Zinc	4.50
Cast aluminum	17.00
Sheet aluminum	17.00